Assembling the Historic Environment

Heritage in the Digital Making

William R. Illsley



UNIVERSITY OF
GOTHENBURG

Dissertations defended at the Department of Literature, History of Ideas and Religion, no. 67

© William Robert Illsley, 2021

Department of Literature, History of Ideas and Religion
University of Gothenburg
Box 200
405 30 Gothenburg

Cover illustration: *A City Street*, 1918, by Paul Klee
Photo: © The Israel Museum, Jerusalem, by Elie Posner
Cover layout: Niklas Olovsson

Print: Kompendiet, Gothenburg, Sweden, 2021

ISBN: 978-91-89284-04-3 (PRINT)

For Maud, Marie, and Gwen

Abstract

The historic environment is a formulation of the cultural past as experienced and documented in space. Traditional approaches to the historic environment tend to favour conservational and preservational paradigms, such as heritage stewardship or the dynamics of cultural resource management in relation to national policies. Alternatively, they often enquire into the entertainment and time travel approaches of contemporary museum and tourism sectors. Instead, this study will focus on digitality, aiming to arrive at an epistemology for drawing a distinction between the presentation and the communication and broadscale transmission of assemblages and spaces in the historic environment.

This approach is framed around a comparative study between UK and Swedish approaches to virtual heritage, including immersive technologies and XR (extended reality), and the digitised approaches to site and monument inventory, born out of the nineteenth-century state-led interest in the preservation of cultural traditions within the public sphere. In doing so, I identify the recurring themes enrolled in processes surrounding the digital creation and transmission of historic environment material. Often, this is manifested in the politics of representation and identity, as well as the dynamics of accessibility. Audience matters are crucial to both approaches, but in this thesis, I argue that broad cognisance of usership is not fully understood and that the benefits of interdisciplinary humanistic approaches to the historic environment are not being sought. The argument is that simply making a tool or product accessible is not the same as making it egalitarian, nor easily useable or meaningful. It is found that the risk is often run of creating products whereby the audience is broadly the same in terms of culture or profession to that of the product creators.

Many of the root issues, in particular those regarding diversity, are established in the current definitions of what the historic environment is as a physical entity embedded in the cultural landscape. These definitions are described within and expanded upon through proliferation of social and spatial theories to proffer a more abstract definition of the historic environment as a social space in its own right. By removing the physical boundaries of landscape, the goal is to re-establish a historic environment without the limitations of authorised vocabularies, narratives, or terms of authenticity, that shackle the historic environment to local or national government institutions. This in turn allows for a more socially defined, participatory, and holistic approach, returning the historic environment to a cultural realm defined by the lived experience of the contemporary public.

This doctoral thesis is based on the following articles:

1. Illsley WR (2019) Problematising the Historic Environment Record: Comments on persistent issues in England and Sweden. *Conservation and Management of Archaeological Sites* 21(2): 113–134.
2. Illsley WR (in review) Hybrids and Heritage Resources: Rethinking the social foundation of the Historic Environment
3. Illsley WR (2020) Göteborgs Födelse (The Birth of Gothenburg). Permanent Exhibition, Gothenburg City Museum, Gothenburg, Sweden. *Nordic Museology* 28(1): 120–126.
4. Illsley WR (2021) Digital Surrogacy: Politics and Aesthetics in Visualising the Historical Past of a City. *International Journal of Heritage Studies*.

Languages: English

Keywords: historic environment, critical heritage studies, authorised heritage, heritage politics, digitality

Contents

Introduction *15*
Lines of Enquiry *20*
Geovisualised Datasets **20**
Virtual Heritage **21**
Digitality **23**
Background *26*
Becoming a Historic Environment **30**
Digital Development **33**
Method and Procedure *36*
Theoretical Application *39*
Actor-Network Theory **39**
Spatial Theory **42**
Assemblages **51**
A Comparative Approach to Digital Historic Environments *56*
Development of Terms *60*
On Historic Environments **60**
On Heritage and Critical Heritage **64**
On Digitality **67**
An Article Summary, in Brief *76*
Article I: Problematising the Historic Environment Record: Comments on persistent issues in England and Sweden **76**
Article II: Hybrids and Heritage Resources: Rethinking the social foundation of the Historic Environment **78**
Article III: Göteborgs Födelse (The Birth of Gothenburg) **80**
Article IV: Digital Surrogacy: Politics and Aesthetics in Visualising the Historical Past of a City **82**
Conclusions *85*
Geovisualisations **85**
Virtual Heritage **87**
Comments on the Broader Domain of Digitality **89**
Supplementary notes *91*
Accessibility, Equity, and Representation **93**
Authenticating Space in the Historic Environment **100**
Final Thoughts **111**

References.....*113*

Preface

Relatively fresh from a Master's degree, which I had embarked upon in the hope that I would never again have to wallow in quaggy and sodden trenches devoid of archaeological content, I was fortunate enough to find gainful work as an assistant historic environment records officer for the county of Hampshire. Unbeknownst to myself, I was given the job due to my supervisor recognising the difficulty of obtaining a position in the archaeological sector post-Master's, or so the joke was in the office after she left not long after my arrival. It was, I think, just a joke, at any rate. However, having had to relocate some distance, at least in English geographical terms, to 'the South' no less, I was determined to make my mark; vindicate the decision to hire me, with or without pity, and do everything by the book. It was not until much later that I found that there isn't really a book to go by, or should I say not just one book to go by, certainly as far as heritage was concerned.

Therein lay the issue to some extent. I had not been able to say in any clear terms what heritage was. In my mind, it was synonymous with archaeology. Archaeology was heritage; heritage was archaeology. Perhaps, worse still, I was convinced that to be of value – analytically, academically, communally – a site, monument, or object had to be categorised or mentioned in some way in the historic environment record. Or if it had any dubious origins, i.e., from non-specialist or amateur sources, then it did not rightly hold a place in the hierarchy of heritage. Amateur archaeologists, community groups, excitable but interested individuals, were all sneered at from my smug ivory tower of local government archaeology. The subject of metal detectorists provoked hostility. Such was my determination to operate by 'the book'. In any event, this was apparently a self-instructed ontology, given that my immediate colleagues were sage and open-minded.

I know how this looks. Whatever book I was going by was evidently outdated, outmoded, and obsolete. I was the template for the institutionalised, authorised heritage practitioner. I cannot even say for certain that by the end of my tenure, I had become more enlightened to the concept of critical heritage. This came as somewhat of a shock awakening much later after being hired as a doctoral student and upon encountering Rodney Harrison, both in person, and through his meticulous and comprehensive reading lists. However, what I can say with some certainty is that by the time I applied for this doctoral position there was a rising doubt about how we defined, assembled, and encountered the historic environment in its current guise and digital application.

While I was yet to grasp the finer points of the more critical ontologies surrounding the heritage sector (both academically and professionally), I began to question the usefulness of inventorying heritage assets. Operating within the planning and development sector, it seemed to be only serving other elements

of the planning and development sector. Archaeologists and/or historic buildings specialists curated data for other archaeologists and/or historic buildings specialists. The public rarely featured, short of the occasional outlandish interpretation of a relatively innocuous feature; questions from property owners about the listed status, or whether they could install the extension they had wanted. At worst, public calls were politely and patiently fielded and quietly forgotten or laughed off; at best they were forwarded to Historic England, who are responsible for listed monument and building status.

The issue was that the local government expected my job role to handle the flow of data in and out of the database. Yet, it was an operation funded by the taxpayer. It seemed that there was somewhat of a wasted potential for public interaction and 'meaning making' to be squeezed out of what I considered then and still consider now to be a resource of unrealised value. With this ticking over in my mind, I turned my thoughts to proposing a doctoral thesis that considered digitality as the root of this potential and submitted my proposal to a call for doctoral applications under the theme of 'Digital Heritage: The future role of heritage and archive collections in a digital world'.

Acknowledgements

No man is an island,
Entire of itself,
Every man is a piece of the continent,
A part of the main.
If a clod be washed away by the sea,
Europe is the less
– John Donne, *Meditation XVII, Devotions Upon Emergent Occasions*

It is thoroughly without shame that I utilise a now much clichéd passage to open my acknowledgements, as throughout this very rewarding, occasionally stressful, period of my life I have had the good fortune to have met and had the support of a great many friends, colleagues, and family members. I had, in fact, been very tempted to quote The Beatles,[1] due to my wife's and father-in-law's lifelong love affair with the band; but getting by with a little help from friends didn't seem to do justice enough to the network of people who have inspired and guided me along the way.

My foremost thanks are extended to my supervisors, Mats Malm, Cecilia Lindhé, and Jonathan Westin, without whom I would be flailing about like a wet sock on a washing line. Between them, they have monitored my work and well-being with great care and attention; managed my sporadic over-expectations and disappointments; tempered my occasionally impolite article critiques and mentored me through all aspects of academia along the way. In a similar vein, I extend my gratitude to Anna Foka and Kristian Kristiansen for their critical insight and in-depth analysis of my thesis during my pre-defence. Their encouragement and commentary was of great help in overcoming the final hurdles of the thesis production process. In the realisation of the proposal and thesis, a great deal of gratitude is also due to Alan Crozier, for his proofreading, and David Hopkins, county archaeologist at Hampshire County Council. The latter's sage advice, good nature and fount of knowledge was of great inspiration in applying for this position. Without his support and guidance, I would be greatly diminished.

Among the many things I have profited greatly from during this period of study, there is perhaps none greater than the CHEurope: Critical Heritage Studies and the Future of Europe Innovative Training Network. To which I would like to like to thank the directors, Gian-Giuseppe Simeone and Kristian Kristiansen, along with the entire cohort of supervisors, students, and speakers.

[1] A footnote may be the only place I can get away with indicating my preference for Joe Cocker's rendition – I consider myself to be an adopted son of Sheffield after all.

Special thanks are extended to the Digital Heritage work package. Between Carlotta, Hannah, Nevena, myself, and our supervisors, I feel we made quite a team and offered a positive contribution to the project. Further to this I'd like to offer my gratitude to Moniek Driesse, and her husband, Sjamme Van Der Voort, whose company and intellectual and emotional support throughout the project should be firmly acknowledged. It should also go on record that Sjamme produces an excellent elderflower beer.

It was through the CHEurope project that I had the privilege of being seconded to *Göteborgs Stadsmuseum*. For this I am much obliged to Carina Sjöholm, Dennis Axelsson, and Tom Wennberg for accommodating me in the office and offering their advice and knowledge along the way. Håkan Strömberg was also of great help in the writing of Article III, as was David Anthin of Kistone AB. Thanks also go to Arvid Forsberg for the demonstration of the *Göteborg 1698* model and his permission to utilise material from the model for my case study. In regard to the seminar opponents, whose commentary was formative in the production of Articles II and IV, I'd also like to show my gratitude to Fredrik Portin and Andrine Nilsen. Furthermore, having been accepted on the Past Urbanisms course as part of The Nordic Graduate School in Archaeology's Dialogues With The Past series, I'd like to thank Per Cornell for his time and advice.

Within the Department of History of Ideas, Literature and Religion, special acknowledgement goes to all of the colleagues, both academic and administrative, who have helped me navigate life in Swedish academia. I'd particularly like to thank Phil Lavender and Benjamin Britas Eriksson; the former whose warmth and sunny disposition regularly provided a sense of level-headedness, and the former whose frequent office intrusions often became a highlight of many a hard day. Along with my friends and teammates from Göteborgs Studenters IF, both Phil and Benjamin could also be relied upon for company at the bar when achievements needed celebrating and sorrows needed drowning.

Finally, I wish to thank my family, especially my father, Peter, my mother, Philippa, and my grandmother, Gwen, without whom none of this would have been possible, and for that I am forever grateful. I would be remiss not to thank my sister, Victoria, for offering her proofreading skills, and since it'd feel monstrously unfair not to, I'd like to thank Jessica, the middle sibling, simply for her quirks and quiddities. Lastly and perhaps most importantly, I'd like to thank my loving wife, Maud, and daughter, Marie, upon whom my very being depends.

Funding

As one of the 15 Early-Stage Researchers taking part in the ‘CHEurope: Critical Heritage Studies and the Future of Europe’ Innovative Training Network, this work was supported by funding from the European Union, through the H2020 Marie Skłodowska-Curie Actions [grant number 722416]

List of Abbreviations

ADS	Archaeology Data Service
ALGAO	Association of Local Government Archaeology Officers
ANT	Actor-Network Theory
AR	Augmented Reality
CAD	Computer-Aided Design
CAVE	Computer Assisted Virtual Environment
CIfA	Chartered Institute for Archaeologists
GIS	Geographical Information Systems
HER	Historic Environment Record
LiDAR	Light Detection and Ranging
LPA	Local Planning Authority
MIDAS	A Manual and Data Standard for Monument Inventories
NPPF	National Planning Policy Framework
OCR	Optical Character Recognition
OS	Ordnance Survey
RAÄ	*Riksantikvarieämbetet*, Swedish National Heritage Board
SMR	Sites and Monuments Record
VR	Virtual Reality
XR	Extended Reality

Introduction

Although the historic environment has its definitions rooted within archaeological discourse since the 1970s (Baker 1977), it has only relatively recently been formalised as a standard terminology within the professional practice and legislation of contemporary heritage (Baxter 2004, 2). On the face of it, at least where practice is concerned, defining what the historic environment entails seems relatively straightforward – surely, it is essentially the palimpsest of the physical remains of the past? At least this is generally how the distinction is made between the material realm of the historic environment and heritage. Praxis determines what we value and want to retain access to for future generations as distinct markers of identity, place, and past. However, there is a great deal to scrutinise in regard to the historic environment, especially in the means through which digitality determines both the usage of and access to the historic environment. The development between its conception in the 1970s and the present day has most certainly been impacted by advances in heritage theory and technological capacity. The role of digitality, as simply a tool or an epistemological process, ought therefore to be considered when mapping the evolving approaches to heritage. How these fit with the concept of the historic environment and whether this has been investigated thoroughly enough on theoretical grounds is therefore explored in depth within this thesis.

There is much to challenge around concept of the historic environment, the creation and use of historic environment records, and the way in which heritage is mediated through the planning process as part of placemaking. While such questions have not necessarily been neglected previously, there is ample room for theoretical negotiation with the concept of the historic environment – particularly with materiality and intangibility. Given the insistency and persistence through which current definitions rely on the landscape, it is clear that this aspect should not be abandoned entirely. However, this approach should not be considered binding either. Instead, this thesis will approach the impact of digitality and the theoretical implications of space and assemblage when considering the historic environment.

Space in this context is related to the notion of place and location 'as an artefact of human history and experience', defined by the humanistic parameters of occupation and perception in our surrounding environment (Yi-Fu Tuan 2018; Dunn 2019, 2). In the same context, assemblage is a general logic of multiplicity for bringing together fragmented elements (Nail 2017, 21–23) – in this case the human artefacts and performance within space – as recombinational, independent events within a heterogenous aggregation of spatial heritage. These two aspects can be directly linked to how we approach the concept of digitality.

Digitality, as an overarching field, covers a range of methods 'relating to identifying, visualizing, and analysing spatial data' and is becoming 'increasingly important within the fields of classical literature, archaeology, and heritage' (Foka, McMeekin, et al. 2021). The broader field of digital heritage has long been connected to the concept of historic environment, but rarely problematised to any great extent. In this thesis, the primary focus will therefore be the question of how digitality advances the theory and practices employed in communicating the historic environment. This is a question not just of the present, but of potential, crossing disciplinary boundaries in terms of practice, professions, and theory.

In order to explore the question of digitality in the historic environment, it will be discussed through a triptych of domains: through geovisualised datasets and virtual heritage as constituent processes of digitality, and through the general logic of digitality as a form of knowledge production. The following questions are thus posited:

Under the domain of geovisualised datasets:

1. What happened to the records and field recordings that compose records of the historic environment in the process of digital expansion?
2. Following on from that, if there is truly the desire to overcome the flaws in current systems, how do we deliver genuine public benefit through geovisualised historic environments?

Under the domain of virtual heritage:

3. From producer to user, how does accessibility and its associated facets, including power structures, diversity, and multivocality, impact the viability of virtual heritage as a gateway to encountering historic environments?
4. In hyperreal historic environments, what forms does authenticity take in virtual heritage and how do anachronism, accessibility, and

immersion contribute to this?

Under the domain of digitality:

5. Taking digitality into account, can objectivistic definitions of the historic environment as a material facet of the cultural landscape be broken down into more nuanced terms as products of space and assemblage?
6. In terms of performance and materiality, is it enough to consider digitality as a tool to be utilised or should it be regarded as an epistemology that fundamentally influences the user's experience?

To some extent, the papers in this compilation thesis deal with Q.1 through Q.4 (the questions will be referred to in shorthand throughout the text). Q.5 to a degree, and Q.6 were by and large best answered through the sum of the work undertaken. The case studies described in the articles provide the conceptual basis for much of the discussion, as well as evidencing practical and theoretical issues in praxis within the historic environment sector. It is through this work that the need for a re-examination of the definitions of a historic environment is identified. Similarly, the case studies also offered perspectives on digitality, to the extent that a meaningful difference between the utility of digitality and epistemic digitality should be distinguished for a comprehensive understanding of the state of affairs in the historic environment sector to be attained.

In *A History of Place in the Digital Age*, Stuart Dunn points to a spatial turn in the humanities, marking the point that the concept of place and space in the human past and present took on its own significance as an area of research (Dunn 2019, 5). It was through this turn that the limitation of technologies such as geographical information systems (GIS) came to be a more frequent aspect of debate. This roughly coincides with what Maurizio Forte describes as a '"visual age" in the domain of digital-virtual technologies in archaeology' (Forte 2011, 8), heralding a shift in the study, preservation, and display of cultural heritage from the point of data capture to research result display (Forte and Murteira 2020, 2). It is therefore within the limits of the relative technologies and practices that the lines of enquiry relating to geovisualisation and virtual heritage are bounded.

While a more detailed definition will be divulged in greater detail later on, geovisualised and virtual approaches to the historic environment can be simply described as follows:

Geovisualised approaches are the digital frontage of archival records of the historic environment. These datasets are created from attribute-based records

of the physical remnants of the past mediated via GIS. This is not revolutionary technology, nor is it a singular technology – instead being comprised of a variety of different combinations of hardware and software (Wheatley 2004). As the second article highlights, such datasets are commonly employed throughout the world. However, while the content can be described as historic environment data, it is only in the UK and Sweden that the term historic environment record holds weight in terms of policy and practice. In contrast, a virtual heritage approach entails the use of computer-based technologies that communicate cultural heritage content as an experience, 'based on the recreating or reconstructing of data, measurements, and observations' (Champion 2021, 6).

While the two are largely distinct, combinations of the two can be achieved, particularly through the usage of GIS platforms. Modelling empirical data from GIS to 3D can form a key part of archaeological enquiry, as well as directly linking rigorous quantitative data to more qualitative simulations as the evidence base for visualisation (Richards-Rissetto 2013). In addition, despite initial criticisms of the bi-dimensionality of GIS, the work of Campanaro et al. (2016) demonstrates the plausibility overcoming the dimensional limitations of GIS. By producing workflows for the production of integrated three-dimensional replicas of monument and GIS tools, every 3D graphic layer can be queried in a similar manner to the layers of a 'traditional' geovisualised dataset. This, of course, does not fully provide solutions to the experiential poverty of GIS approaches. Rooted fundamentally in material and Cartesian approaches, the visual benefits could certainly enhance historic environment records, but offer less in terms of a phenomenological meeting with the historic environment as a whole.

Although there is a degree of structure to the limits of the boundaries to technology and its praxis, to what extent these boundaries are fixed, or fluid, is also something that should be kept in view. As a heterogenous resource, containing the records of the physical, ephemeral, or even extinct remnants of the past, it would be easy enough to pair geovisualised datasets with assemblage theory. The utility of the rationale of assemblage retains a structural element that can be likened to the structures 'embedded in the enterprise of social science research' (Marcus and Saka 2016, 102), therefore attaining a level of epistemological rigour. Likewise, given the propensity to use virtual heritage technologies to visualise historic environments as heritage spaces (see Article IV), this would seemingly pair well with the theoretical concept of space.

If, as I contend in this thesis, the historic environment is an abstract point of contact, rather than the material consequences of its dataset, i.e., 'the material residues of past cultural actions' (Jones 2012a, 93), then the rationale of both

assemblage and spatial theory must be equally applied the geovisualisation and virtual heritage. Unlike archaeology, which is its own distinct discipline with a unique character, the historic environment as an embodied space, albeit with abstract qualities, and as an assemblage should not be hampered by tensions between synchronic role of artefacts, materiality, and landscape, and the diachronic analysis of their meaning, development and conceptualisation. Instead, as an assemblage and a space, the historic environment embodies our ties to the past in the present, mediating the negotiation of heritage.

Lines of Enquiry

'This is the language of the on-again off-again future
And it is Digital'

- Laurie Anderson, *Language of the Future*

As with the questions and boundaries of the study itself, the lines of enquiry for the thesis are delineated by the same triptych of geovisualised datasets, virtual heritage, and digitality.

Geovisualised Datasets

To develop answers to Q.1 and 2, surmising the emergence of database entries as digital objects and how to engender public benefit, the geovisual line of enquiry depends on the development of processes in existing systems of recording. Although a more detailed background to historic environments as archives and databases is offered later in the kappa, it is necessary to briefly sequence the production of geovisualised datasets into three distinct phases. These can broadly be described as systematisation, integration, and valorisation.

The systematisation phase begins in the nineteenth century. Without comprehensive typologies, theory and classification were influenced by evolutionary aesthetics by the likes of Oscar Montelius in Sweden, Augustus Pitt-Rivers in Britain and Gabriel de Mortillet in France (Schnapp 1997, 322). By the twentieth century, we begin to see incremental legislation in urban planning contexts, such as the UK *Housing and Town Planning Act 1909* which 'highlighted local authorities' role to safeguard the public through intervention should they feel private enterprises performed any injustices' (Morel 2019, 1). This leads to government financial support for rescue archaeology, starting in earnest during the Second World War in response to threats to sites by wartime activity (Thomas 1997, 137). Field recording in response to threats thus characterises much of the twentieth century.

If the first phasing of this process can be determined by analogue processes of recording and hand curation of records, then integration can be characterised by the gradual digitisation of data towards the end of the twentieth century, via scanning, optical character recognition (OCR), and manual entry. For example, in the UK, 'Scheduled Monuments have gone from card index, paper forms, hand-annotated maplets and county map volumes to a series of stand-alone county databases built in a database package called

Superfile, and then a national system built in Oracle' (Newman 2011). From here they attained their current material status in geovisualised databases. Not only did this solidify archaeology's status within physical planning systems, but it also marked a turn towards the inventorisation and survey of the entire physical landscape, rooted in quantitative summaries and evaluation based upon natural, cultural, geological etc. values (Kristiansen 1998, 116). The result was the integration of heritage management, public planning, and large-scale conservation.

To some extent, given that the infrastructure was already in place, digitisation marked a period of decentralisation. This is in the sense that it engendered the principle of open and remote access from anywhere in the world via the world wide web. In moving through systematisation and integration, the phase we find ourselves in now might be best identified as a period where valorisation of the historic environment is of greatest significance. Although we are not at a point of perfection, this is marked by social value becoming an integral component of current legislation. While the systems of inventory remain fundamentally an administrative instrument, we find ourselves within a political context where public benefit is engrained in policy. There are, however, questions about the longevity of this public turn. For example, a 2020 UK government White Paper indicates the potential for negative developments on the horizon. Cautionary signs stem from 'an oversimplified categorization of land, reduced potential for public engagement, and more formulaic approaches to conserving the historic environment and its setting' (Belford 2020, 19).

Virtual Heritage

Q.3 and 4, dealing with the accessibility of virtual historic environments and the social production of authenticity, can, like geovisualisation, be linked to the existing process for the creation of virtual heritage applications. Given that in the main, virtual heritage is independent from geovisualisation in its presentation, it will be shown here that the divergent goals of presenting historic environments in this domain require a separate line of enquiry.

As a way of presenting the physical aspects of the historic environment in landscape terms, GIS software has been a part of the archaeological toolkit since the late 1980's and early 90's. However, despite breaking ground in visibility analyses, much has been made of the limitations of such software when it comes to phenomenological approaches to landscape, with its quantitative nature essentially divorcing the historic environment from human experience (Richards-Rissetto 2017, 11).

One of the crucial phenomenological aspects of lived space is that 'feeling

goes through a person and at the same time binds them to the surrounding world' and as such affective fields, atmosphere, and embodied cognition are difficult to sustain geovisually (Almevik and Westin 2020, 14–15). Comparatively, the 3D aspect of virtual heritage therefore offers users 'a sense of mass and space more closely attuned with human perception' (Richards-Rissetto 2017, 16), allowing more intuitive interaction that is ostensibly deemed more accessible to non-specialist audiences. While not unproblematic in various ways, virtual heritage in relation to historic environments denotes user-generated virtual geometries used for the creation of real and hypothetical archaeo-historical applications. Modelling software, such as CAD, Maya, or Sketchup, or survey techniques such as photogrammetry or laser scanning are generally the primary creative drivers.

To some extent, the body of work, exemplified by the output of the Digital Archaeology Laboratory (DARK Lab) at Lund, relating to delivering 3D technologies in GIS format, already deals with the furtive research questions I had in mind when proposing this project. This work demonstrates that the inclusion of 3D models, and grounding them in semiotics, annotation, and alphanumeric datasets, within the records of the historic environment is both plausible and achievable without the need for *ad hoc* software (Campanaro et al. 2016, 331). However, the process of production and the constituent politics of creation, authenticity, immersion, and accessibility are still a pressing matter for critical concern. As a user-generated process there are far more risks, biases and uncertainty.

On these grounds, the concept of hyperrealism is influential in determining the concept of simulacrum, i.e. the image of representation of an object or space, in virtual heritage. The work of Jean Baudrillard is particularly relevant to the intermingling of the real and hypothetical in 3D visualisation of historic environments (Barratt 2021, 18). 'What every society looks for in continuing to produce, and to overproduce, is to restore the real that escapes it' (Baudrillard 1983, 23). As an irreclaimable facet of human cultural construction, the goal of rebuilding the past, its relicts and its vanished components as a '"material" production is that of the hyperreal itself' (ibid.). As such, realistic imagery has a tendency to mislead end-users. Given the availability of virtual heritage in many published formats, often without supporting archaeological evidence, there is an inherent risk of presenting hypothesis as fact in the process of constructing virtual heritages (Barratt 2021, 18).

While theoretical frameworks such as the Principles of Seville and the London Charter are intended to mitigate misrepresentation (International Forum of Virtual Archaeology 2011; Denard 2012), the case studies in this thesis demonstrate that these frameworks are not universally observed. As critical heritage discourses are a key component of my perspective, it is

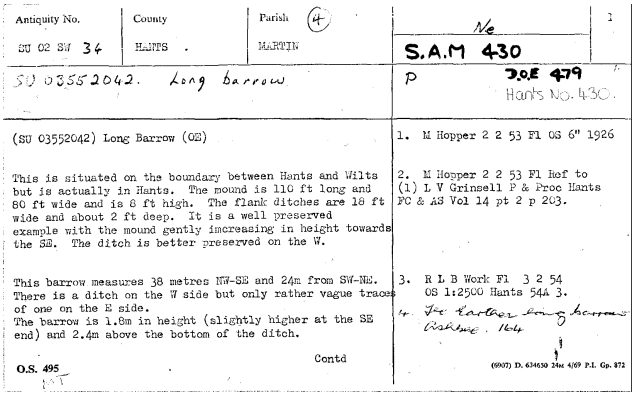
necessary to consider the politics of production and presentation of virtual heritage, particularly taking the impact on the end-user into account.

Digitality

Q.5 is bounded by the limits of materiality in the historic environment, which in turn affects question 6 in the sense that digitisation and digitalisation has a material impact. More specifically, though, Q.6 asks whether the technological processes involved in the translation of material are sufficient, or whether they need to be regarded as a new form of knowledge production.

Archaeology, and by extension, historic environments, are tendentiously bound with material culture, which along with landscape 'form key components of the core business of archaeological research' (Jones 2012a, 94). As Christopher Tilley (2001, 258) argues, 'Material culture is a relational and critical category leading us to reflect on object-subject relations in a manner that has a direct bearing on our understanding of the nature of the human condition and social Being in the world'. Thus, materiality is implicitly relevant in the actualisation of space. Furthermore, as an active agent (Jones 2012a, 94), material culture may also be considered as being a semiotic discourse to be read and decoded, bearing meaning and signifying beyond itself (Tilley 2001, 258). The issue relating to historic environments is that digitality can blur the lines between material and immaterial, and raises questions about how its performance impacts the users' experience of the material world.

Both geovisualised datasets and virtual heritage are digitally remote from the material context of the original objects and landscapes they represent in a corporeal sense. In the past, there was therefore arguably an artistic quality to the material of the archive (Newman 2011) when records of the historic environment were physical and required bodily interaction. This is particularly true of the Ordnance Survey (OS) card index which consisted of an 8″ × 5″ card index providing information about antiquities and a set of annotated 1:10,000/1:10,560 maps relating to monuments covering the whole of Great Britain (Flower 2019; Murray 1999). This required a greater performative responsibility on the part of the user and custodian in terms of visiting and manually accessing the material. The digital aspect of geovisualised datasets alters both the performance and the medium, but it remains the case that 'The records are descriptions of something material on a medium that is itself material' (Newman 2011). The hardware and code of the systems that run the databases demonstrate materiality. They endure as historic documents and, as I argue in Article II, as monuments in their own right.



Antiquity No.	County	Parish (4)		1
SU 02 SW 34	HANTS	MARTIN	S.A.M 430	

SU 03552042. Long barrow

P DOE 479
Hants No. 430.

(SU 03552042) Long Barrow (OE)

This is situated on the boundary between Hants and Wilts but is actually in Hants. The mound is 110 ft long and 80 ft wide and is 8 ft high. The flank ditches are 18 ft wide and about 2 ft deep. It is a well preserved example with the mound gently increasing in height towards the SE. The ditch is better preserved on the W.

This barrow measures 38 metres NW-SE and 24m from SW-NE. There is a ditch on the W side but only rather vague traces of one on the E side.
The barrow is 1.8m in height (slightly higher at the SE end) and 2.4m above the bottom of the ditch.

Contd

O.S. 495

1. M Hopper 2 2 53 Fl OS 6" 1926

2. M Hopper 2 2 53 Fl Ref to (1) L V Grinsell P & Proc Hants FC & AS Vol 14 pt 2 p 203.

3. R L B Work Fl 3 2 54 OS 1:2500 Hants 54A 3.

4. For earlier long barrow visit see 164

(6907) D. 634630 24m 4/69 P.L. Gp. 872

An example of an OS record card from Vernditch Chase in Hampshire, England, photocopied into digital format for inclusion in the digitised HER (Reproduced with kind permission from Ordnance Survey & Hampshire County Council)

To some extent the lines become even more blurred in the case of virtual heritage. The aspect of the hardware and code is equally applicable but the means of translation into a digital medium differs slightly. Although photogrammetry offers a similar process to direct translations of material objects via scanning or OCR, there is a greater propensity for user-generated primary creation of original objects.

There remains a fundamental performative aspect, whether by attending museum-based applications; utilising consumer virtual reality (VR) packages; or even via gamification. But with the exception of mobile augmented reality (AR), there is a risk of thinking of extended reality (XR) as 'disembodied'. Especially, as many systems utilise first person cameras rather than the movement of the user's body. The element that to some extent binds critical approaches to digitality is arguably, therefore, authenticity. How authenticity is created, by and for whom, in digital representation is a debate that has its roots in Walter Benjamin's critique of the mechanical reproduction of art in the 1930's (2015b). Subsequent debate has changed the general sentiment, elucidating aspects such as technological and contextual sophistication as well as co-production (Jones et al. 2017; Latour and Lowe 2011) as facets of authority dismissed or unexplored by Benjamin's stance. A significant issue is that of virtual processes rendering materiality as passive – focusing on binary, purified dichotomies of real and unreal, without due attention to perception and the networks of construction of which the user forms an integral part.

Meaning and cultural value are arguably what add depth to the historic environment, rather than aspects such as photorealism and verisimilitude. This

opens the possibility for the reframing of narratives including aspects of fabling and citizen science approaches for communicating heritage. Different agents and groups contribute to common heritage through their own narratives at different spatial scales (Frank 2015, 25) throughout the historic environment, thus it is crucial that these are explored in the digital process. In parallel to Angela Piccini's (2015, 6) analysis of the role of media archaeologists, in regard to the historic environment, practitioners, architects, and data custodians must move away from 'revelation' towards an understanding of the co-production of materialities. Like the past, the historic environment does not sit passively awaiting interpretation; it is made.

Background

> 'The Past is over. People make believe that it isn't, and they show you things in museums. But that's not the Past. You won't find the Past in England. Or anywhere else, for that matter.'
>
> – Christopher Isherwood, *A Single Man*

The past both as an idea and as an expression of human residuality, tangibly and intangibly, is undoubtedly a key component of how we express heritage, a concept that prevails almost equally to that of the past. It is most probably a truism to state as much. As the material facet of hyperrealism (Baudrillard 1983, 23), the past represents the elements of the historic environment that we, as heritage practitioners, wish to preserve, represent, and communicate across all mediums. How digitality, as technological method and epistemology, both markers of contemporaneity, impacts our understanding of the past is of great relevance in how we formulate practice and policy. The ability to transmit the past in novel and more cognisant formats across a broader spectrum of society, speaks not only of its continued relevance but of how the concepts of the past and heritage are produced.

However, heritage is not necessarily the same as the past, nor its constituents. Heritage is very much a contemporary experience, no matter how much of it is informed by past practice or material culture. Whether collectively or individually, such practices no doubt inform us as results of memories, or experiences, or interactions with an infinitesimal range of objects, ideas, and individuals, human or otherwise. How, why, and when these phenomena take place is difficult to pin down. It is often contingent and never a given. This much is perhaps evidenced by the contradictory nature of contemporary parliamentary politics and world affairs, where the events of the past seemingly fail to trickle down to the day-to-day consciousnesses of vast swathes of the global population. Even so, heritage is not a marker of what is meritorious as right and wrong. Indeed, much of what we know to be our heritage from past action is deeply disturbing when violent or socially incompliant. In many instances what we find repellent is often hidden, not as a result of the past, but as a consequence of what we find palatable today.

The sources for which the past is recorded are uncountably numerous, encapsulating the product of human societal achievements in totality, and beyond, including the evolutionary processes that shaped us and the global processes we in turn have shaped. In the process of shaping, ontological distinctions can be made. Objects are simply inanimate 'that lack any ability

themselves to inflict independent blows on each other' (Olsen and Witmore 2015, 188); tied to the actions of a privileged agent, i.e. living *things*. In comparison, *things* perform and have agency, no matter how passive; they 'all intervene and play different roles in shaping the matter that we claim to know best' (Olsen and Witmore 2015, 188). For example, the Bastille as an object is simply an obsolete relict, yet its foundations, symbology, and cultural legacy have far outlived its makers. It has formed 'new alliances' and offered up 'unpredicted qualities' rather than being merely derivative of the intentions of its interlocutors (Olsen and Witmore 2015, 188).

If then, as Tim Ingold (2010, 2) argues in *Bringing Things to Life: Creative Entanglements in a World of Materials*, our relations with the world are with a world of *things*, and not a world of *objects*, then the past represents the beginning of continuous entanglements of growth and movement between materials and forces – aligning with Gilles Deleuze and Felix Guattari's theorisation of life's essential relations in *A Thousand Plateaus* (2005, 335). Self-affirmational and renewing (Barrett 2014, 70) or not, 'This present past is far from solely an outcome of human management or intentions but sediments and transforms according to its own diverse material trajectories' (Olsen and Witmore 2015, 191).

Yet without straying into the realm of purifying the world into opposite realms, of these things, humanity remains representative of the dominant force. Indeed, should we truly 'follow these flows, tracing the paths of form-generation, wherever they may lead' (Ingold 2010, 3) we would have to consider the range of irreducible things, materials and forces that are encapsulated in the global assemblage – the past truly becomes immeasurable. Like Ingold tracing the composition of things and forces, we can draw upon Paul Klee's notebooks in order to interpret the past. Klee determined that 'What is good is form as movement, as action, as active form. What is bad is form as immobility, as an end, as something that has been tolerated and got rid of … Form is the end, death. Form-giving is movement, action. Form-giving is life' (1992, 269). In this schematic, if the product of the past, i.e., the record or object or thing, constitutes form, and therefore the end, then the process of recording, transmitting, and cognitive realisation is akin to form-giving. Form as objects fixed in time and space is unproductive. Form as things has a trajectory that produces new realms of understanding. It is these processes that are transformed by the application of digitality, both materially and performatively, and in turn is integral to the subject of this thesis's research agenda.

The notion of form and the negative implications of the above clearly need unpacking. If digitality is essentialised as simply as a technology or universalised solution to depicting the form of a historic environment as a

material element of the past, then the potential for misrepresentation can indeed have adverse consequences. But bad is clearly not the inherent status of the past, though nor is it necessarily good. The defining element is invariably the role of humanity. If movement then is key to harnessing forces, rather than scientific conformity, truly immanent movement requires 'the forces of a *people*' (Deleuze and Guattari 2005, 337), and it is within peopled forces that subjectivity is born. The past, as a product of the social forces that construct it, is often at the whim of heritage industries as well as neoliberal urbanism and economic projects (Mayer, Thörn, and Thörn 2016; Mouffe 2005, 102). This often entails packaging memory and cultural products for the increasing public awareness and consumption of past (MacDonald 2013, 3) as well as justifying 'processes of regulatory creative destruction' in urban settings (Mayer 2016, 60). As Plets (2016, 194) highlights modern states utilise heritage, in particular archaeology, 'through a suite of technologies of rule (bureaucracies, statistics, education …) to create governable subjects habitually adhering to specific power structures and regimes of truth'. This he likens to Foucault's notion of governmentality and the establishment of administrative apparatuses such as education security, political economy, and statistics (Foucault 1991).

As a form of governmentality, these structures of power depend on seeking the immutable. In preference, genesis and growth are more desirable as knowledge production, learning, and value creation, rather than the object of the past in and of itself. On the contrary to the past being an object to discover or store or preserve, it is the line that 'grows from a point that has been set in motion, as the plant grows from its seed' (Ingold 2010, 2). To Klee, this represented creativity as a process in its entirety (1992, 269). So while the past *is* everywhere, as David Lowenthal concisely opens *The Past is A Foreign Country – Revisited* (2015), and, as he later adds, 'embedded in our minds and muscles, our genes and genres de vie' as 'manifold residues', the methods through which we consciously select, revere, and appropriate the past as heritage is a process firmly committed to our own constructs.

This is, of course, a particularly academic view of heritage theory. It is not necessarily how the past and heritage are perceived at all levels, nor how it is utilised in contemporary society. There are more clearly identifiable aspects of the past, existing as discrete phenomena, products, and places in the landscape. Far from representing the past in its entirety, the majority of the object traces have ceased to exist at all (Lowenthal 2015, 1), and it is often these discrete phenomena that are totemic within public consciousness. As well as through our own everyday encounters and inscriptions of value, the comprehension of the past, harking back from the first forays into written histories through antiquarian fumbling in landscapes of monuments to the products of contemporary archaeology and museum collections, remains immensely valuable within collective knowledge.

It is probably fair to say that for a dose of reality, the general appreciation of the past is not derived from Deleuze and Guattari's logic, nor do I imagine they intended it to be. Rather than a sprawling web of things and their entanglements, it is quite often contrary to rhizomatic theoretical perspectives that the past is understood and valorised in a general sense. It is rather the pre-eminence given to the form of materials and objects that frequently draws the focus. The primacy given to these aspects is part of the spectrum through which we not only understand and record history but how we perceive our own daily lives. If we take as a given that our experience of the present is 'very largely' dependent upon our knowledge of the past (Connerton 1989, 2), then what can be recorded and how it is recorded is key to both individual and collective memory. Such elements of the past, and the components of past activity, take an important role in the formulation of heritage. This is both in terms of the preservation of the facets to which we attach our values, and also regarding how we formulate strategies for managing and communicating heritage.

Regardless of common understanding, or theoretical nuance, the components of the past, be it object or thing, seldom exist in a vacuum. The sites, spaces, and locations they exist within are key to the context and understanding of the objects or things themselves. As such, these landscapes are not only deeply entangled within the network of heritage values but are frequently valorised as heritage entities in their own right. In defining these loci one might use a somewhat static term, simply: place. But places can be and mean many things to many people, whether on macro or micro level. London is as much a place as England is a place, as too is Europe, for example. Places are deeply entwined with our existential being, though not through any inherent or diffusive organic process, but through our own conscious concepts of value. As Ashworth, Graham, and Tunbridge point out, 'Specific place identities are … created in order to legitimate the claim by a group upon defined physical spaces' (2007, 54). The past, unsurprisingly, plays a significant role in this. The gradation to how we apply these values and identities is therefore 'formed and defined by legacies from the past' (Smith, Mauch Messenger, and Soderland 2010, 15) on local, national, or regional levels. Memory and heritage, however, are not fixed by the boundaries of place.

It may be said that in fact 'excessive focus upon bounded sites of memory risks fetishising place and space too much' (Atkinson 2007, 523). This is especially relevant to this study, given that historic environments are so frequently bounded by the material landscape, and as such, are primarily determined that way when reproduced digitally. Indeed, to return to Ashworth, Graham, and Tunbridge (2007, 56), heritage and memory are dynamic and constantly productive, overlapping and enmeshing within space,

making, remaking, and observing multiple and sometimes conflicting pasts often within a singular space, monument or even object. Such phenomena are continually ongoing, represented relatively clearly by the clashes between anti-racist, anti-colonial iconoclasm and conservative cultural conservation paradigms. The removal of white supremacist street furnishings (Hicks 2021; Hicks and Mirzoeff 2020) or the struggling justification in the light of calls to repatriate objects, such as the Benin Bronzes (Hicks 2020), as a form of engaging with the aftermath of the colonial project, are just two examples.

The mobility and exchange of digital material have the potential to process social upheaval. Digital forms of documentation, record, and visualisation have a capacity for activating the archive, which in turn 'produces as much material as it records' (Derrida 1998, 17). Data can be added or subtracted at varying degrees of effort, time, and cost. But in order to be effective, constant reappraisal of digital spaces, whether geovisualised or modelled, is needed to form a reflective, socially relevant abstraction of the historic environment as a cultural assemblage.

Becoming a Historic Environment

Attaching the concept of digitality to historic environments is surprisingly not much older than the concept of the historic environment itself. As Heather Richards-Rissetto establishes, the advent of GIS as a means of spatial data management occurs in the late 1980's (Richards-Rissetto 2017, 10). Historiographies of historic environments present a similar timescale for epistemological conception. David Baker wrote of the idea of the historic environment being a complex concept, covering 'all relics of past human activity, their investigation and preservation, and attitudes towards them: it reflects contemporary social and intellectual preoccupations' (1983, 27). As Lowenthal describes, 'our heritage comprises an interdependent spectrum of relics ranging from the great collective features of the environment to the trifling of souvenirs and personal memorabilia and from the most enduring remains to the merest shadows of what they once were' (1981, 13). Rationalisation of this nature was considered to be less than a decade old in 1983 (Baker 1983, 39), and as such it might be said that heritage and the historic environment were envisioned as part of the same general logic roughly contemporaneously.

In principle the digitisation of heritage explored in the database context has come to focus on the power of digitality and computing to link text to digital representations of mapped physical space (Dunn 2019, 50) and adding depth to the analogues of shallow mapping. However, the early iterations of geovisualisation were problematic in their reliance on depicting Cartesian understandings of space, i.e. utilising coordinates to define space as an absolute based on its homogenous character (Lefebvre 1991, 14). In early GIS models,

'No location within geometric space could be argued to have any kind of priority over any other', reducing 'the world to the occurrent' and rejecting 'any concern with spatial meaning' (Thomas 1996, 84). But while this represented a practical issue to be overcome, the very conceptual development of the historic environment has also had issues in regard to spatial meaning. As the historic environment terminology has come into force, contemporary definitions place less emphasis on the narrative of space and more upon its material content. Compared to the attention lent to developing phenomenological aspect in GIS studies, landscape dependency in the historic environment indicates a reverse direction of travel to some extent. Correcting this and seeking the convergence in epistemology is in essence the nexus of the research questions on geovisualised datasets.

In order to provide answers, it is necessary to delve further into the understanding of the development of how the historic environment as a term came to be, and how it is applied in practice. The element of historicity attached to both past and place is difficult to separate. However, relating landscape to heritage is inherently troublesome, as both are in a 'constant state of construction, deconstruction and reconstruction' (Kelly and Norman 2007, 173). As a product of social process, place is one of 'the primary means by which we articulate with space and transform it into a humanized landscape' (Preucel and Meskell 2004, 215). Place and placemaking are important, and often intertwined with identity. Crucially, place should not be conflated with landscape, which exists within a broader environmental paradigm than a purely site- or place-based approach (Finch 2013, 143). Geological epochs aside, like heritage, our perception of landscape is entirely in the present (Howard 2009, 52); any monument, regardless of provenance or age, is still experienced alongside more immediate construction within the same terrain and topography.

Even so, both heritage and landscape have become commonplace as 'categories of scholarship and education, of experience and performance, of entertainment and commerce, of policy engagement' and lastly, as aforementioned, 'markers of identity' (Harvey 2013, 152). Although argued to be difficult to commoditise as an academic field in its own right (Finch 2013, 143), 'historic environment' represents a partially successful attempt at packaging this framework into a handy, all-encapsulating term that values the past landscape in its totality. From its conception, the 'historic environment' terminology required time to take hold, particularly in Europe, given UNESCO's preference for the term 'Cultural Landscape' (Howard 2009, 52). Its use has since risen especially in evaluation and management practices in the UK (Herring 2013, 176). In this context, it is considered to be more than simply a 'rebranding of the sector' but a pivotal branch of the tourism industry and community regeneration as focal point for external changes in 'management

structures, attitudes and treatment' (Baxter 2004, 3).

Regardless of its growing ubiquity, the historic environment terminology far post-dates the process of registering, itemising, and inventorying of heritage resources, with the earliest forays into recognising antiquities of a national interest arguably marked by Sweden's first *Riksantikvarie* (National Antiquarian), Johannes Bureus, who was commissioned alongside a statute protecting state antiquities on 20 May 1630 (Gardinge 2018). By abstracting historic and cultural resources within the landscape as a singular concept, when coupled with distinct policy, the process of categorising and datafying the landscape became a formal proposition. The first policy enacting this in earnest was ratified by France's 1837 *Commission des Monuments Historiques* (Harrison 2013, 44). The Commission highlights one of the two key technical terms present throughout the history of inventorying ancient remains: the site and the monument.

Despite both being fairly basic and generic terms (Darvill and Fulton 1998, 14), both are open to considerable discussion. Sites are the more inclusive of the two, denoting a specific area of land (ranging in size from metres to kilometres) within which 'an event involving the structured observation of some archaeological content of that land has taken place' (Darvill and Fulton 1998, 14).

In comparison, according to the UK Ancient Monuments and Archaeological Areas Act 1979, a monument is constitutive of:

1. any building, structure, or work; whether above or below the surface of the land, and any cave or excavation

2. any site comprising the remains of any such building, structure, or work or of any cave or excavation

3. any site comprising, or comprising the remains of, any vehicle, vessel, aircraft or other movable structure or part thereof which neither constitutes nor forms part of any work which is a monument within paragraph (1) above

Neither term is particularly inclusive in terms of demarcating an environment. However, the conceptualisation of sites and monuments at least presented a limited but relatively meaningful criterion for systematically recording archaeological remains.

There also remain issues as to the restrictive nature of the early terminologies used to systematise recording, however. Later government frameworks began to protect the 'significance' of a range of 'heritage assets', some statutorily 'designated' and others not (Hewitson 2019, 300). The National Planning Policy Framework (NPPF) (Ministry of Housing,

Communities & Local Government 2019) introduced a definition of heritage assets, being:

> A building, monument, site, place, area, or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing).

This not only broadens the protective scope by placing the heritage assets alongside the natural environment (Hinton 2013, 16), but it also more clearly promotes a degree of local nuance in recording. Arguably local nuance is part of that which promotes public benefit within the community. It is this contrast which remains strongest between Swedish and UK practice, but also a key driver in public participation. This too falls within the scope of this research agenda in driving public benefit through bottom-up participation.

Digital Development

While a more in-depth exploration of the breadth, both historically and geographically, of such recording processes is offered in Articles I and II of this compilation thesis, a history in brief charts a process of textual and cartographic recording for use in spatial planning and as a public information source, best characterised by the development of Sites and Monuments Records (SMR) in the UK. Initially, an analogue process using a card-based catalogue system developed by the Ordnance Survey (Phillips 1959), now known as Historic Environment Records (HERs), the process is now largely represented by 'a digital database … with supporting hard-copy documentation such as illustrations and reports' (Darvill 2009b).

In defining SMRs, Timothy Darvill (2009b) shows that early recording 'tended to be based on spatially definable geographic units or points of archaeological interest'. In these systems 'events' are differentiated by time in space. A simplified form of the process is depicted in figure 1b of Article II, but essentially relates to 'definable interventions or engagements with archaeological material' beginning with the earliest phase of human occupation as an occurrent, followed by subsequent phases of excavation or survey within the same spatial context. While this still implies what Stuart Dunn (2019, 49) describes as an 'unproblematic association between the place in the human record of the real world and place in the vectorised world of the geo-database', it does at least add an element of temporal depth to the mapping.

Digitally circumscribed HERs are only representative of a singular form of recording in the historic environment. What is regarded as virtual heritage offers alternative techniques of modelling the past, and debatably one that similarly found place around the time historic environments were conceived. However, from the furtive constructs detailed below, a great deal of progress

has been made. No longer are singular monuments inscribed digitally, but whole urban landscapes, drawing the historic environment together. It is this emphasis on the latter that the research questions focus upon.

To paraphrase David Lowenthal, like heritage itself, the historic environment is so diverse 'as to seem incommensurable' (Lowenthal 1985, 37). If we contend with the past, whether as objects or landscapes, we must also contend with its heterogeneity, as inexhaustibly but demonstratively depicted here:

> Iron Age forts, Greek temples, Celtic jewellery, runic inscriptions, Georgian buildings, neo-Gothic whimsies, ridge-and-furrow plough marks, steam engines, windmills, Morris dancing, Macaulay's histories, art-deco cinemas, coronation mugs, 1930s juke-boxes, 1950s dress styles, 1960s movies, Golden Oldies, visits to Rome, Pompeii, the treasures of Tutankhamun and the horrors of Madame Tussaud's, childhood memories, chats with grandma, seaside souvenirs, family photographs, family trees, old trees, old money – all these connect with some treasured past (Lowenthal 1985, 37).

As recognition of this was embraced, so were techniques of recording. After all, there is not and cannot be a broad-brush technique for recording heritage. In 1983, not long before Lowenthal's foray into the foreign countries of the past, early attempts were made to create representations of the Roman Temple of Sulis Minerva in Bath. Here the techniques utilised to create solid models in a bird's-eye view and short tour of the site were documented (Woodwark 1991, 19). As these technologies advanced, so did the capabilities to incorporate interactivity, as well as rich representations and passages through time and spaces in the birth of virtual heritage as a form of study. The resultant products were therefore qualitatively different from traditional media and narratives (Dave 2008, 40–41).

Virtual heritage has become able to actualise space in different and graphical ways (Roussou 2002, 93). This is presented in three basic forms (Tan and Rahaman 2009, 146):

1. Documentation – as a process of discovering, recording, and analysing heritage data
2. Representation – loosely characterised by 'reconstruction'
3. Visualisation – a process of dissemination as the means of transmitting cultural knowledge and information to various publics

Digitised historic environments, in the manner traditionally explored, have continued to meet the needs of the heritage components of spatial planning, primarily in development-led archaeology. However, with the creation of historic environments as a facet of virtual heritage, a convergence between technology, heritage, and new audiences through remediated networks became

plausible (Russo and Watkins 2007, 154). These networks enable the understanding of accessibility, diversity and authenticity, and are the key to the line of questioning (Q.3 & Q.4) that envisions virtual heritage as hyperreal encounters with historic environments.

Method and Procedure

Generally speaking the methods and procedure utilised in this thesis are of a qualitative nature, in that they focus on 'the development of concepts which help us to understand social phenomena … giving due emphasis to the meanings, experiences and views' (Pope and Mays 1995, 45) of social participants. There is a necessity to generalise to some extent, given the unquantified number of social participants due to the fragmented and diverse publics that utilise digital historic environments, primarily because of incomplete, inconsistent, or non-existent recording. A criticism raised by Göran Larsson challenged the humanities as a critical faculty of academia, arguing that there are constant risks of diffusion. He cites the difficulty of distinguishing truths from falsehoods through the inability to supply the empirical analysis provided by science and social studies (Larsson 2019). Yet determining what is true and what is not is not the point of this thesis, nor as Åsa Arping argues in reply to Larsson, the humanities in general. Rather, it is a means of showing changing perceptions of the truth as a phenomenon in constant flux and providing a framework for critical approaches to knowledge (Arping 2019).

More than that, however, qualitative and critical studies are frequently bound in 'Concrete, context-dependent knowledge' (Flyvbjerg 2006, 225). For example, the image, whether in literature or semiology, is bound in a 'phenomenological process that structures the perceptive or intuitive faculties of the reader/subject in relation to space and time' (Hay 2011, 311). There is a locutionary element bound to the visual, and the visual is mediated by language (Hay 2011, 305), which is lexically determinable. Knowledge of this nature, Bent Flyvbjerg argues, is necessary 'for predictive theory, universals, and scientism, the study of human affairs is, thus, at an eternal beginning' (2006, 223). Therefore, while this thesis is deeply bound in the development of a theoretical perspective, it is not an attempt to universalise the process of digitality but an alternative means of understanding the social processes in place. Furthermore, it is supported by measurable statistics and the understanding of the methods in place for the creation of geovisualisation and virtual heritage, contributing to the means of developing perception and public discourse, as per the scope of the research agenda.

Chronologically, the first aspect of the method has its roots in professional practice ahead of the commencement of my doctoral studies. This is derived from my tenure as Assistant Archaeologist at Hampshire County Council, England. This role was fundamental to my understanding of how geospatial software, such as GIS, was incorporated into archaeology and planning. By using such systems as an interface for mapping historic environment data housed in a digital inventory, I was involved in the contemporary practice of digital heritage first-hand. It also allowed an opportunity to identify flaws and

limitations in how the dissemination and distribution of data impacted the understanding and availability of regional heritage as an egalitarian process. Developing an understanding of policy at local planning authority and government level was a crucial aspect of this. Familiarity with these guidelines and the language used was fundamental in identifying patterns in similar frameworks in different contexts, for example in recognising the value of *Kulturmiljölagen* (Historic Environment Act) (Kulturdepartementet 2016) and understanding the impact of the developments in RAÄ's Digital Archaeological Process (Larsson et al. 2017) upon the heritage management process in terms of efficiency and public usefulness. This experience can be broadly condensed within the scope of the thesis as a form of fieldwork, not only allowing for the development of the thesis proposal for this doctoral study, but also providing personal perspective for the research in Articles I and II.

The role of CHEurope played an equally large role in the methodology. As one of the European Commission's (2018) Innovative Training Networks, this project's series of joint research seminars and summer school programmes were crucial in developing a wider and more comprehensive grasp of heritage theory, politics, and dynamics. Led by researchers, professionals, and academics from diverse backgrounds, including design, art history, architecture, literature, and archaeology, genuine international and interdisciplinary networking was intended to be the nexus of the curation of the programme. Its implementation and the access it offered to unfamiliar schools of thought and heritage perspectives mirrored the interdisciplinarity that I argue is inherent to the historic environment itself (Illsley 2019, 113). As such this network, and the intensity of the required input, became constitutional to the nature of this thesis. This inspired thematic approaches or narrative threads to follow through varying critical approaches to heritage in anthropology, museum studies, human geography, city planning, and tourism. In relation to my research agenda, this was crucial in understanding the broader interpretation of heritage, enabling the analysis of accessibility and diversity in current heritage processes.

Further to the content of the training programme, the network the project was enmeshed within was also vital to the means of gathering the contextual knowledge behind the case studies in Articles III and IV. As a primary requirement of the project, a secondment within one of the partnership institutions was necessary. In this case, the secondment I undertook was within the Museum of Gothenburg's Development Department. This allowed access first and foremost to the museum itself, working weekly within the museum environment and observing the processes in place within the department. Most pertinently to the content of this thesis, it allowed me frequent and largely unrestricted access to the staff working on and within the Birth of Gothenburg exhibition and the digital surrogate of the seventeenth century. This was

mediated through informal and unstructured interviews with staff at the museum and *Stadsbyggnadskontoret* (City Planning Department). The former was used to build rapport with the staff, particularly as a means of demonstrating my interests to them and their work, as well as to formulate a line of questioning for the unstructured interviews. This latter form of interview was the process through which I gained most of the information about the processes of both exhibition curation, and model design and construction. In terms of the methods of interviewing, in both cases the subject was purely related to heritage output, and no personal data was recorded or used. As the primary focus was process, rather than opinion, the interviews were unrecorded, with the resulting notes being used to formulate the manuscripts for Articles III and IV.

To deepen the academic rigour, bivariate analysis was undertaken. In the case of Article III, this was in the guise of a secondary unstructured interview with personnel from Kistone AB, who were engaged by the museum as narratologists and set designers for the Birth of Gothenburg exhibition. Again, the interview was largely respondent-led, and aimed to follow the process of the narrative design, as opposed to the previous interview with museum staff which identified the choices behind the exhibition's thematic and critical approaches. In relation to Article IV, bivariate analysis was supported by reference to a focus group. As part of the KUD101 *Kulturarvsteknologier* (Advanced Digital Tools for Heritage Conservation) Master's course that I jointly coordinated at the University of Gothenburg's Department for Conservation in 2020, one of the tasks assigned to students as part of an excursion to the Museum of Gothenburg was to critically review the virtual reality installation displaying the city's seventeenth-century surrogate. This was both as a digital product and in the context of the museum itself, relating to the critical concepts introduced to museum goers through the Birth of Gothenburg exhibition. While only a single direct quote was used in the article, the responses offered an understanding of how digitally focused postgraduates responded to the installation. While, in general, as well as in this case study, greater audience-led evaluation is necessary, this methodology is particularly relevant for determining whether public benefit is effective via the employment of virtual heritage.

Theoretical Application

'We've all got opinions
Where do they come from?
Each day seems like a natural fact
And what we think changes how we act'

– Gang of Four, *Why Theory?*

'I could sit on the roof
On top of that abstract house
See my abstract view
An abstract mouse
I want to live on an abstract plain'

– Frank Black, *(I want to live on an) Abstract Plain*

The theoretical focus of this thesis is comprised of the theories of actor networks, space, and assemblages. The actor-network theory is readily apparent in the content of Article II, and thus its exploration here aims at increasing the understanding of the article. As a measure of authenticating and emoting responses to digital environments, spatial theory forms both a foundation to Article IV, and a means of inferring the vitality of historic environments, particularly those of an urban setting. The city, after all, is subjective, and not a universal truth – as with heritage and the historic environment – and as a result an understanding of the various interpretations of spatial theory was necessary in order to revisualise the historic environment. This is compounded by the theory of assemblages in extrapolating meaning from the historic environment in its broadest sense 'to describe the entire material, spiritual and emotional world of people in the past' (Chadwick 2004, 1) and the perception of this in the present. In this manner, assemblage theory contributes to the foundations and potential for reworking a definition of the historic environment, as well as providing a platform for a more generous discussion section.

Actor-Network Theory

In visualising inventoried historic environment data in geospatial form, at first glance records appear as points on a map, dotted haphazardly across a 2D environment, 'understood in terms of representing horizontal, linear features on the earth's surface' (Dunn 2019, 5). There is, in such instances, a depth to such representations; the dots are not merely dots, but geo-referenced markers for records pertaining to fractal, palimpsestic human intervention in the landscape. Such interventions range from the primary occupation, or building phase, however far back in time that stretches, to contemporary exploration –

usually in the form of archaeological exploration or building conservation. However, such maps are emotionally limited, such is the format of commercial archaeological literature. Generally, they are restricted to the tangible and material. They are not 'the discursive and ideological dimensions of place, the dreams, hopes, and fears of residents' (Bodenhamer, Corrigan, and Harris 2015, 3) but instead form a gateway between matter and meaning, and data and knowledge. Although they may not coincide with the definition of a 'deep map', we are not witnessing a simple dichotomy between shallow and deep mapping. How then, are they to be understood and linked together?

In conjunction with visualising the historic environment as assemblages, I primarily turned to the ANT popularised by Bruno Latour, the depth of which is explored by Article II. Functionally, ANT acts as a descriptor and means of analysis that treats 'the social and natural worlds as a continuously generated effect of the webs of relations within which they are located' as a flat ontology. Simultaneously, they explore and characterise 'the webs and processes that carry them' (Law 2009, 141). Latour prescribes that the term 'social connection' is a form of connection between many things that are not themselves inherently social. Social ties do not designate a claim to reality but the name of a movement via translation or transformation – neither of which might be recognised as being social in the usual manner (Latour 2005, 64). Social value is not inherently embedded within objects but is instead constructed and deconstructed by various degrees of policies and attitudes. As a simplification, or an abstract of the ideology, objects are formed as hybrids of their material being and the social aggregates, mediators, or intermediaries behind them.

Much stems from Latour's (1993) response to the concept of Modernism as a means of slicing the world into distinct categories, denying networks and seamless fabrics and consequently forcing the division between 'Moderns' and 'PreModerns'. This builds upon his earlier work exploring the construction of scientific fact with Steve Woolgar (1986). The processes Latour and Woolgar observed in scientific laboratories are as much applicable within the museum or the historic environment record, particularly in the way antagonistic social oppositions are set up in the creation of fact. Latour's observation of the process through which these are mobilised as statement, citations, or enrolment of fieldwork as a collective process in the establishment of fact is particularly compelling (Latour 1987). The organisation of rhetoric and social ties as 'black boxes' elides the operation of construction. What we encounter as fact is often a highly creative social process, incorporating physical evidence, materiality, and objects, with a network multiple agents, experts, and interpretations. All of which are hidden behind the medium through which we encounter archaeo-historical heritage.

Within these networks, humans and human agency can be understood through these relations to a 'heterogenous plethora of non-human entities'

(Holbraad and Pedersen 2017b, 39) – the eponymous actors of ANT. While Article II goes deeper into the matter of theory, the networks can be characterised by the multiplication of what Latour calls hybrids (1993, 10). These hybrids of both culture and nature, whether mediated by object or actor, are symbolic of the impossibility of separating the world into two purified dichotomies – dichotomies that in Latour's ontology are indistinguishable in the first instance. Thus, while it not as simple as to categorically state that a hybrid is a mixture of two pure forms, as neither form is a reality according to Latour, the term serves to symbolise the thinking of the ilk of Michel Callon, Donald MacKenzie, and Thomas Hughes, as well as Latour himself, in their attempts to retie the Gordian knot undone by 'Moderns' (Harman 2009, 63).

The corollary of this ontology is particularly evident when we look at the world of knowledge creation. Harman points to Latour's example of reading a 'typical newspaper' as a means of clarifying. How in a world of 'frozen embryos, expert systems, digital machines, sensor-equipped robots, hybrid corn, data banks, psychotropic drugs, whales outfitted with radar sounding devices, gene synthesizers, audience analyzers' (Latour 1993, 49–50), all hybrids through and through, does one distinguish 'supposed hard facts from supposed social constructions or projections of value' (Harman 2009, 62)? It is through this that Latour moves to highlight not only the similarity between the etymologies of fact and fetish, but also to join their sources. To advance the mobilisation of the simultaneous products of 'construction and reality, immanence and transcendence' (Latour 2010, 21–22), 'Factish' becomes his operative terminology.

Whereas Latour utilised ANT as a means of radicalising the structure of sociology as a means of locating truth through the translations within networks, specifically the concreteness of reality – an actor is its relations (Harman 2009, 17) – the approach I have taken with ANT follows Martin Holbraad and Morten Axel Pedersen's summation of the ontological turn in anthropology (2017a, 4). In this sense, I am utilising ANT as a methodological intervention, as a means of creating the conditions through which we can see things in contemporary heritage praxis. To extend this to its logical conclusion, this entails not how one sees things, but what there is to see in the first place (2017a, 5). This is evinced within the articles primarily through exploration of the networks of historic environment records and how the biases within these networks interfere both with the equity in the performative elements of data trawling, *apropos* of the agency and status of the user, and also as a means of bringing notions of authenticity, authority, and responsibility to the fore.

In this light, inventories of the historic environment have become a mechanism for reinforcing the hard social distinction between past and present as imposed by modernity. As regular components of the archaeological record,

we resultantly become allies to objects, structures, and collectives, rather than to social contexts and structures of power (Latour 1993). Instead of experiencing the past through the extension, conservation, and preservation of its fabric, we are creating asymmetries between actants and networks in both internal and external processes – separating ourselves further from those that preceded us. An ideal historic environment is a documentation of continuity, with no break or distinct otherness. A record in this vein moves beyond the tangibility of objects and structures to experience of space and social hierarchy through exploration of the translations and mediations taking place. This not only embraces greater exploration of contemporary spatial exploration and landscape character, but requires greater common awareness within the sector.

While networks as systems of inventory are explicitly discussed in Article II, this does not preclude the notion of digital surrogacy or virtual heritage from the discuss of actor-networks. As opaque as record entries are, the acts of representation and visualisation that characterise representation and visualisation, whether presented in AR, VR, or any other communicative media, are often equally reliant on the enrolment of power, narrative, rhetoric, and constructivism without clarifying their position. This in turn leads to the argument that 'the past is being globalised as an assemblage of agreed upon symbols that becomes our heritage rather than reflecting it' (Westin, Foka and Chapman 2018, 283). As Jonathan Westin has also elaborated, what is often conceived as a singular product within the framework of 'culture' is also subject to a network of limitations, non-visual and voiceless actants, such as audiences, policies, laws, and practices, that permeate all the procedures of creation, alongside ourselves as heritage professionals and practitioners (Westin 2012, 30).

Spatial Theory

Space and place as concepts are discussed throughout this thesis, perhaps most explicitly in Articles III and IV. However, there remains some disconnect between the exploration of theory below and the content of the articles. To add clarity, what is scrutinised below is, in essence, representative of the underlying theories behind my work. Space and environment are intrinsically interlinked, and the exploration of space and the principle of locating heritage within space as place- and identity-forming concepts is a core argument in this thesis and in the elucidation of historic environments in general. It is spatial theory that allows for the analyses of the locative aspects of memory, presentation, embodiment, authenticity, diversity, accessibility, and the intangible aspects of praxis in space. It is through an understanding of the vitality of space alongside its abstractness that current definitions of the historic environment can be problematised and challenged.

In recognising the abstract elements of the historic environment as well as

its humanised content mediated via a varying array of heritages, the fact that there is 'a complex series of overlapping imaginings (and non-imaginings) of place' (Ashworth, Graham, and Tunbridge 2007, 54) at play cannot be ignored. Likewise, it cannot be posited that space is nothing more than 'a passive locus of social relation, the milieu in which their combination takes on body' (Lefebvre 1991, 11). Given the theme of interconnectedness effectuated in the dynamic between place identify and heritage, one could follow Latour's object-oriented ontology through to the exploration of space and its dependence on actants, as a logical extension of the aforementioned principles of ANT. Similar to Leibniz (Leibniz and Clarke 2000), Latour's concept of space is not one of an absolute, empty container but of a site of relation between things. He states that 'Space and time do not frame entelechies. They only become frameworks of description for those actants that have submitted, locally and provisionally, to the hegemony of another' (1988, 165). Therefore, while space in a Latourian sense is dependent upon what an actant does, it is the tension between a real object and its relations as a hybrid whole, rather than simply the relation between the tangible qualities of an object (Harman 2009, 218). But as Harman points out, space is a site of both relation *and* non-relation; of nearness *and* distance (2009, 218). This does not necessarily satisfy a broad understanding of what space is, particularly in relation to place.

While I consider ANT to be useful in understanding the distribution of agency in the means through which the historic environment is accessed, there are drawbacks, which Kristian Kristiansen (forthcoming, 5) likens to fetishism as a form of false attribution of power in modern thing theory and posthuman theory. This critique draws on the work of Alf Hornborg, who sees such theory as the abandonment of relationism, i.e., the notion 'that seemingly bounded material objects should be understood as the products of wider and intangible fields of relations' (Hornborg 2016, 7). This Kristiansen (forthcoming, 5) sees as negating the role of 'human power and responsibility'. I have supported ANT with assemblage theory in determining the structure of networks as a means of supporting Hornborg's (2016, 172) calls for understanding human-object distinctions as relations of power. However, in gauging human spatial interaction, networks alone are not enough to fully understand the dynamics. Therefore, it is in answer to the critiques of Kristiansen and Hornborg that the theoretical element of this thesis moves beyond a purely object-oriented approach to turn towards a more anthropological understanding of place and how it become actualised in lived, human terms.

Theoretical Context

According to Andre Leroi-Gourhan (1993, 313) the symbolic erection of time, space and society is necessary for human stability within the natural

world. Thus, he contends, it is not the creation of tools, but the domestication, or creation of human time and space that denotes the human *par excellence*. In ordering space in relations to its actants, landscape becomes 'plastic, open-ended, and receptive' (Olsen 2010, 8). Bjørnar Olsen asserts that it is not just things and materials but landscapes too that have 'real qualities affecting and shaping both our perception of them and our cohabitation with them' (2010, 9). Therefore, as a conceptual point of contact with heritage and space, the historic environment forms a means of organising space and ordering the universe around us. It is through the lens of the historic environment that we not only understand our cohabitation within the landscape but it also 'reflects the cultures of our progenitors and influences our own' (Holtorf 2011, 157).

My reckoning of the historic environment is somewhat similar to Cornelius Holtorf's, with his determination that we should look for 'pastness' as a reflection of culture rather than age (Holtorf 2011, 157). Rather than forming an immanent part of the material element of the landscape, the historic environment is present in the elements of our surroundings 'that either possess the quality of being of the past (pastness)' or are reminiscent of it (Holtorf 2011, 158). Thus, it is a question of the perception and experiences of these surroundings that influence the assemblage of the historic environment. Holtorf calls for investigation into the conditions under which 'human beings experience pastness in relation to a given place and precisely what that means' (2011, 157). Under the given condition of digital access to pastness and place, this is essentially one of the principles of this thesis. To unpack this, however, the spatial study of theory and phenomenology in our surroundings is a necessary step not only in reaching an alternative definition of the historic environment, but in understanding how the complexities of human perception and experiences relate to the digital spaces they encounter.

Finding a point to begin with is somewhat difficult. One could engage with the steadfast essence of place through Heideggerian understandings of dwelling as '*the basic character* of Being in keeping with which mortals exist' (2013, 158). Likewise, the poetics of Gaston Bachelard offer insight into '*felicitous space*'; the intimate 'eulogised space' that we love (Bachelard 2004, 19), particularly in relation to 'its reality and its virtuality' (2004, 27) in realising that 'place can be nonphysical and yet still count fully as place' (Casey 1997, 288). After all, we each carry distinctly valuable and unique places that are as mobile as we ourselves are, from the academic fulfilling the mobility requirement for their funding, to the refugee fleeing a war-torn homeland. However, given their personal and largely unshared nature, they are not particularly efficacious spaces in terms of visualising historic environments on a broader scale.

In the vast body of work on spatial theory, it is clear that many iterations of the understanding of spatial theory are influenced by their precursors. So,

while the likes of Aristotle, Descartes, Heidegger, and Bachelard remain relevant, in addressing spatial theory in the context of this thesis, with its critical perspectives on communal approaches to digital heritages, wider reaching spatial theorists are explored in an effort to unravel the conditions for digital advances in the historic environment. Further to this, while many are not distinctly expressed in the compilation of articles here, the cumulative perspectives these spatial theories offer frame and develop the foundation of my work and allow for the reader's understanding of the source of my lines of enquiry.

Social Space

Aside from the issue of communicating *felicitous space*, at least within the scheme of digital representations of the historic environment, there is another shortcoming. While Bachelard may consider 'nonsensible' places to retain their status as place, notwithstanding this mode of thinking, bifurcating the real and mental, fashions a chasm between 'the mental sphere on one side and the physical and social spheres on the other' (Lefebvre 1991, 6). As a result, the likes of Henri Lefebvre and Michel Foucault turn their focus to the social dynamics of space. To Foucault, space, specifically exterior and public space (Casey 1997, 298), takes form in its relation to sites. But while he does not deny the intersection between time, space, and history, he suggests that 'our experience of the world is less that of a long life developing through time than that of a network that connects points and intersects with its own skein' (Foucault 1986, 22) – making spaces, not time, our primary domain. It is not so much that time is subservient to space, but that history itself is spatialised and deeply entwined with the creation of social space (Soja 1989, 18). Unsurprisingly, given that this is the dominant trope in Foucault's corpus, this historicity is the history of power relations (Thacker 2009, 22).

Like Foucault, Lefebvre recognises that space is modified and influenced not only by history, but by nature as well, stating that this both a political and an ideological process (Lefebvre 2009a, 170). As a tool of 'thought and of action', he too recognises that space can be a means of control, domination, and therefore power, but primarily he considers it a means of production (Lefebvre 1991, 26). By drawing on Marx's views on the role of production in society, Lefebvrian social space is not only a product, but an aggregate, indistinguishable from both mental and physical space (Lefebvre 1991, 27). The production of social space is conceptually underpinned by three interconnected principles (Lefebvre 1991, 38–39):

1. *spatial practice* – what is perceived and experienced as daily life by its inhabitants
2. *representation of space* – what is conceptualised in the realm of science and urban planning
3. *representational space* – what is lived through images and symbols, for

example in art, literature, or philosophy

This schematic is underlined by a triad of (Lefebvre 2009b, 215):

1. *homogeneity* – sameness through repetitive consumption of space
2. *fragmentation* – space as broken down by function into distinct spaces
3. *hierarchisation* – distinction between stronger and weaker points of space; centres and peripheries.

The arrangement of spatial unities for constant surveillance in both material and metaphorical shows of power is no better typified by the 'conscious and permanent visibility' of Bentham's Panopticon (Foucault 1995, 201) or the extremities heterotopic spaces, seen in the likes of colonies or brothels where life is partitioned and meticulously organised (Foucault 1986, 27). These are determined as illusory space that serves to 'expose real space', creating diversity and regulation. This combination of material and metaphor in asserting power is particularly valid in the analysis of digital surrogates of the historic environment. In Article II, the controlled access to the database through performance and vocabulary is likened to the Panopticon, whereas the fundamental unreality of virtual heritage, as a combination of both *representation of space* and *representational space,* is observed in Article IV.

Space and Place

The 'spatiality of social life', as seen through Soja's Lefebvre inspired Socio-spatial Dialectic, both conditions and is contingent upon history. It is simultaneously shaped by and a product of the materialism of history and geography (1989, 58). However, while the fluidity of Foucault's heterotopic space lends itself well to the instability of place (Thacker 2009, 29), Lefebvre does not offer the same distinction between space and place as Heidegger. While Lefebvrian space is fundamentally unbounded and intertwined, interpenetrating, and superimposing themselves with one another, with walls and enclosure only disguising 'ambiguous continuity' (Lefebvre 1991, 87); unlike the discrete *loci* of Heidegger's thinking, Lefebvre saw the obsession with absolute space as a form of nostalgia in a singular historically specific human spatial relation (1991, 122). As such, the social relation between space and place must be ascertained elsewhere.

In similar fashion to the mode in which Bachelard utilises poetics as an allegory for making space legible, by reading or writing a room (2004, 35), Michel De Certeau envisages the bodies of the everyday wanderers of the city 'writing' and following the 'thicks and thins' of an urban text (De Certeau 2011, 93). These intersecting writings are the manifestation of an unread, unauthored story of fragments, trajectories, and alterations of space; creating a

metaphorical city alien to the geographical, clear, and concise texts of the planned city. Walking is, thus, a means of enunciation, organising space through traversal (2011, 98;115). This is pertinent to De Certeau's distinction between *espace* (space) and *lieu* (place). In his thinking, place retains a Heideggerian stability. But through the Lefebvrian hypercomplexity of intersecting mobile elements, considering 'vectors of direction, velocities, and time variables', it is possible that place can be actualised and transformed into space. For example, a geometrically planned place is transformed into space by the act of walking – in essence, practiced place becomes space (De Certeau 2011, 117). This train of thought is echoed by the geographer Yi-Fu Tuan, who emphasises the 'security and stability' of place in contrast to the 'openness, freedom and threat' of space. Pauses in movement, therefore, allow location to become place, essentialising the definitions of space and place with one another (Yi-Fu Tuan 2018, 6).

In his writing on 'Space and Place', Yi-Fu Tuan explicitly describes place as an object form, only achieving concrete reality when experienced through all the senses and mind as a whole. In contrast, space is directly experienced through having room to move (2018, 12–18). De Certeau organises these distinctions in experience through the dichotomy of *map* and *tour*. In this manner, locations are inscribed with descriptions based on 'seeing', i.e., knowing the order of places, or 'going', i.e., spatialising actions (De Certeau 2011, 119). This he is careful not to identify as binary oppositions (Thacker 2009, 32) through the recognition that narratives ('spatial stories') are the fluctuating dynamic that constantly transform and organise places into space and spaces into place (De Certeau 2011, 118).

In the context of understanding digital and virtual heritage, if we see stationary archival access to the historic environment as the stable form of knowing (*map* and *lieu*), we once again harken back to Foucault's panoptic administration of place. Comparatively, depending on how they are accessed, heritage spaces in the form of digital surrogates place more emphasis on the direct experience of moving (*tour* and *espace*) directionally or temporally. The wider task in relation to virtual heritage, however, is how to effectively enable fluidity of spatial narrative, breaking down the boundaries between map and tour akin to the manner in which it is encountered in modernist literature. Thacker (2009, 35) names James Joyce's *Ulysses* as a prime example, though one could further cite Djuna Barnes's *Nightwood*, Alfred Döblin's *Berlin, Alexanderplatz*, or T.S. Eliot's *The Wasteland*, in which the actualisation of space in tour form is afforded primacy compared to the mapped narratives of the realist novel of the nineteenth century. Joyce is known to have utilised cartographic depictions and business directories to lend structure to his novel, but the plethora of tours transcend the depiction of stable *loci*, transfiguring the space of the novel.

Spatial Otherness

If our movement through place is an operative dynamic in how we both experience and actualise space, then consideration must be given to the equity through which we move through space. Casey (1997, 302) draws attention to the work of Deleuze and Guattari as a means of understanding 'other space', for example the margins of society that exist on the fringes of organised settlements. This is not the same as the external settlements existing in a city's hinterland, such as the relation between *Haga* and *Majorna* and the fortified settlement of Gothenburg, given that they are subject to the same state apparatus. Instead, it is bettered defined by the external influence of rival states, such as the threat posed by the Norwegian and Danish states that characterised the need for Gothenburg's inception. This is what Gilles Deleuze and Felix Guattari would determine to be 'a pure form of exteriority' (2005, 354); a metamorphic and heterogenous process, not only delineating diversity but modifying familiar spaces. This is a result of the notion that it is not where a space is situated but how it is structured (Casey 1997, 302).

Deleuze and Guattari further theorise the differences in spatial equity through their distinction between *smooth* and *striated* space (2005, 474). In a *striated* space, lines or trajectories are subordinated to points, in that one traverse from one point to another (Deleuze and Guattari 2005, 479) as it is in an organised street layout. The opposite can be said for *smooth* space, in which the points are subordinated to the trajectory, for example nomadic journeys across the desert or sea crossings where inside space conforms to outside space and dwelling is subordinate to the journey, for example a tent or boat. It is therefore 'a space constructed by local operations involving changes in direction' (Deleuze and Guattari 2005, 479). Again, these are not absolutes, and as Deleuze and Guattari argue, 'the two spaces in fact exist only in mixture', the two are constantly superimposed and translated back and forth (2005, 274).

Rather than being 'in' *smooth* space as in contained space, one is 'on' *smooth* space (Deleuze and Guattari 2005, 493). In essence, dwelling here is accomplished by moving, rather than moving to a dwelling, subverting the principles of Heideggerian place. *Striated* space, on the contrary, is considered uniform, thus restricting the range of movement, and reducing the ambient milieu to a 'set of positions on a grid or a map' (Casey 1997, 308). Richard Sennett illustrates the issue by paralleling space as derived from movement with the rise of the automobile. Although the automobile permits movement, the necessity to get from A to B unhindered means the street plan is simply to 'permit motion' (Sennett 2003, 14). The greater the regulation, via traffic lights or pedestrian crossings, the greater the anxiety. Despite the greater speed and range of travel, as space is contingent upon movement, the geography of the *striated* space of the urban city is predominant to the freedom of movement. This, Sennett decries as dead space devoid of experiential meaning in its own

right (2003, 14). The parallels of technology can also be justly applied to the exploration of virtual space, especially where freedom is limited by the layout of an architectural model. This problematises the concept of immersiveness in expressions of virtual reality where optical stimuli are given primacy or are the only mode of contact.

Bodies in Space; Bodies-as-Space

Diversifying heritage space is a key contention of critical heritage studies. As such there is a need engage in norm-critique in conceptualising the historic environment with the body at the centre. Given the multitude of human bodies and cultural expression, diversity is immeasurable. There is no normative stance, hence the term diversity used here, rather than similar terms such as alterity,[2] which imply there is a norm to alternate from. After all it is the body that is our vantage point in the landscape, and our movement, routines, and everyday physical activity that 'continually reproduce our sense of identity' (Chadwick 2004, 7). However, the way this is represented and mediated via the treatment of space and place in both geovisualisation and virtual heritage is under critique. With that rationale, the utilisation of spatial theory in this instance offers comment on diversity, aiding rationalisation of my historic environment definition and compounding the reasoning for its increased breadth.

In Aristotle's treatment of place there are two fundamentals, *topos koinos*, the form of common space in which all bodies are' and *topos idios*, 'in which the body is' as a form of special place; both of which depend on the surrounding form of vessels (Casey 1997, 54). Place is the immediately environing limit of the object, rather than the object itself, relying on circumambient locator presence, rather than merely its receptive qualities (1997, 54–55). However, this leaves the question of how bodies relate to space largely unanswered, given that bodies are both permeable and contained, and can be either mobile or immobile. The existing ambient space surrounding us, as well as the spaces we create and reflect upon as virtual architects and scholars, can 'determine who does and who uses what and when' (Illich 1982, 105). Crucially bodies are different. Illich makes this explicit in the claim that 'Vernacular space not only shapes the landscape and the house, not only reaches into the past and beyond, it extends into the body itself, quite differently for women than for men' (1982, 123).

This is not to suggest all space is strictly gendered, nor do I wish to echo Illich's intimation, following Leroi-Gourhan's (1993, 153) analysis of the inability of primitive societies to overcome the physiological specialisations of

[2] Despite this, the term alterity is used in the published version of Article IV. While critically underwhelming, the reasoning here is largely the result of revisioning post-*slutseminarium* and the drawbacks of the compilation thesis format

sex, that tools and tasks remain gendered (Illich 1982, 105). Rather, I wish to highlight that these differences alter our perceptions and continue to shape the individual response to our movement through place. As Luce Irigaray (1993, 17) asks, 'How can we mark this limit of place, of place in general, if not through sexual difference?' It is only through constituting 'a possible place for each sex, body and flesh to inhabit' that we might 'reconsider the whole question of our conception of place … in order to move on to another age of difference' (Irigaray 1993, 12–18). 'Woman is place' is not simply the crux of Irigaray's thesis – she argues that each of us, male or female, 'has a place that envelopes only his or her bodies' (1993, 36). Casey's interpretation of her writing is that '(the sexually differentiated) body and (its) place are so intimately linked as to be virtually interchangeable' (Casey 1997, 326). Paraphrasing, then, place cannot be without body and vice versa, and the sexed body is central to this. But if heritage is the past as present then accounting for the a-sexed bodies, for the multi-bodies, and for the bodies in transition deserves equal attention.

The role of women as a complex vessel, for child, for man, and for herself (Irigaray 1993, 41) should not be read as a quest for supremacy in space but should serve to remind us that the multiplicity of roles we can potentially embody in society is reflected in how we actualise place and how we in turn perceive space. The historic lack of a distinction between the *flâneur* and the *flâneuse* (Elkin 2017, 8), on the grounds that it was a quintessentially masculine pastime (Pollock 1988, 71), or that the sexual divisions of the nineteenth century restricted female movement (Wolff 1985, 45), are of course problematic. But is representing such spaces as catch-all neutral common ground the right answer? Probably not. The usership of digital technologies must treat historic bodies in such a way as not to render present-day bodies invisible. As Bodil Petersson highlights, the search for authenticity often avoids conscious use of anachronism, but instead the fundamental differences in how the present and future are formed around us should reflect the 'positive consequences of embracing and even forming anachronism as a method for understanding ourselves in relation to the past' (Petersson 2017, 285). Aspects such as 'female power, queer perspectives, diversity, sustainability and the role of children and healthcare in the past' are all sought as evidence in breaking down idealised views of the past (Petersson 2017, 285).

Equally, we should not simply reproduce such spaces alongside their contemporary virtues and values. At any rate, it is crucial that we do not abandon 'room-for-place' in the lives of men, women, and non-normative genders. It is only through making room for place that (gender neutral, undifferentiated) space would become (bodily-sexually specific) place. It is, therefore, not simply the synchronism associated with experiencing the past diachronically, but the way we are displaced as bodily sexed places in our own

right that we as providers of digital space must continue to focus on. There is not, and should not be, a universal and gender-free experience of the past.

Assemblages

The principle of assemblage theory focuses on 'constellations of objects, bodies, qualities or territories that come together for varying periods of time to create new ways of functioning, or new orders' (Jones 2012b, 126). Because of its reading of 'multiple co-existences', assemblages connote power as plurality in transformation, rather than a central power, or equally distributed agency as in ANT (Anderson and McFarlane 2011, 125). As such it is a particularly useful means of considering 'provisional unity across differences', and has been used to some effect in reterritorialising and deterritorialising social differences in fields such as urban and post-colonial geography (Anderson and McFarlane 2011, 126).

In traditional approaches to assemblage, 'empirical, inductive research, which produces results that are relevant only for the studied local context' (Yadollahi 2017, 360) is encouraged. However, these traditional approaches have conceptual limitations, and the methodological strengths are limited by a 'lack of idealism, constructivism or framing the world in pre-defined structure' (Yadollahi 2017, 360). However, by including twentieth-century concepts such as 'how capitalism mediates and is mediated by urban processes' (Wachsmuth, Madden, and Brenner 2011, 745), it is argued that as an analytical approach, assemblage theory can be more productive. This has in turn already led to the application of heritage theory in the specific form of historic environment such as in urban conservation and ontologically making historic cities distinct from contemporary cities (McFarlane 2011; Dovey and Ristic 2017; Yadollahi 2017). While this has contributed to developments in spatial knowledge and practical questioning of space and power dynamics, engaging with assemblages on a theoretical level further contributes the problematisation of historic environment records. This is particularly relevant in terms of understanding the fragmentation and representation of the historic environment, wherein different elements are conceived as fractals of a whole where the whole is not necessarily a reality or relevance.

Assemblage, ANT and Spatial Dimensions of Power

Understanding how assemblages of objects and people interrelate is important. Like objects, persons may be regarded as performative assemblages in a biological sense, composed of a series of relationships (Fowler 2010, 139; Jones 2012b 128). In which case, historic environments may be regarded similarly in geo-cultural terms. Much is owed in that respect to the work of Deleuze and Guattari in defining and radicalising the concept of assemblage. Assemblage is the general logic at work in *A Thousand Plateaus* (Deleuze and Guattari 2005),

and following this logic, assemblages can be conceived as 'a mode of ordering heterogeneous entities so that they work together for a certain time' (Müller 2015, 28). While it is possible to regard bodies through the general logic of assemblage as organic unities, paradoxically Deleuze and Guattari consider assemblages to have a machinic function 'defined solely by their external relations of composition, mixture, and aggregation' (Nail 2017, 23). In this sense they are neither part nor whole, but multiplicities of fractals. An assemblage does not therefore 'have an essence because it has no eternally necessary defining features, only contingent and singular features' (Nail 2017, 24).

As a plane of organisation, assemblages have a 'network of specific external relations that holds the elements together' (Nail 2017, 24), which Deleuze and Guattari determine to be 'an abstract machine'. This they hold to be:

> a hidden principle, which makes visible what is seen and audible what is heard, etc., which at every instant causes the given to be given, in this or that state, at this or that moment. But the plane itself is not given. It is by nature hidden. It can only be inferred, induced, concluded from that to which it gives rise (simultaneously or successively, synchronically or diachronically). (Deleuze and Guattari 2005, 265)

In this sense, the historic environment as an assemblage and space through which heritage is negotiated is an abstract machine. It is the network through which we organise how we understand the past in the present, and as such has no being in and of itself. Policies, legislation, sites, monuments, archaeological intervention, and even heritage itself are the external relations that tie the network together. As such it is far more than the physical remnants of the past in the landscape.

Moreover, the spatial and local dimension of these networks is important in understanding the role of governance and power, and therefore, diversity and accessibility. To Deleuze and Guattari, the state is another example of assemblage:

> It is a phenomenon of *intraconsistency*. It makes points resonate together, points that are not necessarily already town-poles but very diverse points of order, geographic, ethnic, linguistic, moral, economic, technological particularities. (Deleuze and Guattari 2005, 433)

To this end the state is an effect of power rather than the source, which is neither '*a priori* nor is it evenly distributed in space: it runs up against obstacles, works better in some places than in others, is more contested here and is less contested there' (Müller 2015, 32). If we take this logic into the realm of historic environments, it is in the networks and spaces where power is more contested that diversity is sought, and in the spaces where it is less contested that

legislation and policy functions best. It is therefore in the contested spaces that digitality should be utilised in the most critical manners.

As a form of understanding formational process, much like ANT as detailed above, assemblage thinking arranges and aligns 'interconnected entities without any natural hierarchy' in a flat ontology (Dovey and Ristic 2017, 16). Furthermore, both have been at the forefront of characterising the socio-material value of the 'co-constitution between humans and non-humans' (Müller 2015, 27). As such both are particularly useful for decentring 'reified totalities' (Müller 2015, 28). If the historic environment and its various digital mediations are to be decentred, then it is necessary to disassemble the black boxes (see Actor Network Theory) and 'interrogate the production of knowledge and expertise and the enrolment of manifold technological devices in that process' (Müller 2015, 27). This is precisely the goal of Article II and the means through which I have sought to answer Q.2 and Q.5 of the research agenda.

Fragmentation

Fragmentation is an issue I have discussed at length in Article 1, but there is a theoretical layer that can be applied to the practical issues that the article details. This is inspired by the concept of fragmentation and its significance to prehistoric assemblages, best represented by the work of John Chapman and Bisserka Gaydarska (2007). As a social practice, fragmentation and accumulation are linked by the principle of enchainment (Jones 2012b, 126). In this process objects express a 'relationship of enchainment between thing and exchanger' (Chapman and Gaydarska 2007, 9). This includes the exchange of complete objects and fragments, whereby each fragment stands simultaneously as an object in its own right and as a synecdochical symbol of the complete object (Chapman and Gaydarska 2007, 9). In this sense, accumulations of fragments or objects as assemblages can also relate to enchained relationships. This means that through assembling disparate objects, previously distinct relationships can be linked anew as innovative and productive relations (Jones 2012b, 126). To this end, we can see individual records or gazetteers in databases or objects and buildings within a digital surrogate as being symbolic of wider historic environments. In conceptualising the historic environment in this manner, we can better appreciate the small-scale, the local, and the particular, and seek to avoid grand and compressed narratives of human endeavour which 'can reduce the wealth of different human lives and experiences to bland, generalised assertions about the past' (Chadwick 2004, 1).

Conversely, by conceptually being able to relate distinct objects, places, and identities via the enchainment of historic environments, we may be able to

produce innovative connections on a wider scale. As with fragments of once complete objects, fragments of historic environments are fractal and 'interpenetrate other objects, humans and places' (Jones 2012b, 126). Crucially, the notion of fractals indicates 'that there are really no social "wholes", only unfolding relationships which can be viewed at different scales' (Fowler 2010, 141). This can be understood in larger discursive and material contexts such as Nico Carpentier's (2021) discussion of Europeanity as a discursive material assemblage. As noted in the introduction, historic environments are key aspects of territoriality and national identity. If we focus on the digital expansion of the historic environment, and its transmission through wider cultural expression, rather than the predominantly archaeological, the articulation of the discursive and material matters allows analysis of Europeanity and Europeanisation beyond the scope of merely the aggregation 'of governance structures, industries and bodies' (Carpentier 2021, 237). We can look at individual nations as entities, but are these entities necessarily complete? Instead, it may be better to visualise that 'Each single entity is really a "set" of relations' (Fowler 2010, 141). As much can be said for historic environments, to the point where each set of relations is in essence fractal pieces of the anthropological archaeosphere. This can only be achieved via greater theoretical nuance in determining what historic environments entail.

Critical Responses

There is scepticism regarding such approaches. As assemblage theories utilise maximally open-ended terms and methods, they tend to 'resist confronting directly the challenges of theory development and concept formation' (Wachsmuth, Madden and Brenner 2011, 747). Wachsmuth, Madden, and Brenner write of 'a perfect networked description of human and nonhuman assemblages' being the equivalent of Jorge Luis Borges's 1:1 empire map as described in *On Exactitude in Science*:

> In that Empire, the Art of Cartography attained such Perfection that the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province. In time, those Unconscionable Maps no longer satisfied, and the Cartographers Guilds struck a Map of the Empire whose size was that of the Empire, and which coincided point for point with it. The following Generations, who were not so fond of the Study of Cartography as their Forebears had been, saw that that vast Map was Useless, and not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography (Borges 1999a, 325).

A pastiche of Borges's map, expressed by Umberto Eco, highlights 'That the map be faithful, depicting not only the natural reliefs of the empire but also its artifacts, as well as the totality of the empire's subjects' (Eco 1995, 85). However, we cannot know the entirety of a historic environment *in toto*, nor is it the purpose of the record to encompass that. As Tim Evans states, 'we can only synthesise what is written, not what is stored (or not stored) in archives and is never printed' (2013, 20). He further argues that not only should the data from past and present excursions into the historic environment be essential, but they should also be the source of identification in the gaps in what we don't know (Evans 2015).

The presence of lacunae in the network of historic environment is not therefore the larger issue. The issue is how the historic environment is conceptualised and disseminated in order to understand what is missing. There are certainly difficulties when mapping assemblage, but a certain level of abstraction is necessary to account for this. In essence, 'The task of mapping is not to expose or identify some supposed pre-existing truth – but rather to expose a logic through which' assemblages can be made visible (Dovey and Ristic 2017, 26). When reflecting on the mediation of this through the digitality of human technological communication networks, we see that debates on the effectiveness of geovisualisation in capturing space are just the latest in a long line of media issues in depicting space (Dunn 2019, 23). As such spatial knowledge and analysis are inextricably intwined with spatial technology. This is based on the key contention that geovisualisation retains the basic ontology of the Western ontological paradigms of space and place (Dunn 2019, 23). Absolute coverage in assemblage thinking is not, therefore, the goal. Indeed, the search for absolute completeness is very likely a hindrance. It is instead the assemblage's capacity for explanatory and critical ambition to better reflect and communicate the current status of knowledge that should be coveted. It is through this thinking that ontological frameworks for spatial technology can determine what is yet to be understood.

A Comparative Approach to Digital Historic Environments

There is a degree of general application in terms of determining the material grounds of the historic environment through actor-networks, as a space and as assemblages. This generality is furthered mirrored in the technological deployment and epistemological grasp of digitality. However, much of the context and scope of this study is grounded in research focusing on the UK and Sweden. The justification for this is largely based on accessibility, rooted in working experience and knowledge of both English and Swedish languages. The geopolitical aspects of recording are also of interest given the differences in structures. For example, the approaches to field archaeology differ based on 'capitalist' (UK market-based contract archaeology, private archaeological companies), or 'socialist' models (Scandinavia – museums to public organised rescue units) (Kristiansen 2009, 643).

These differences are also manifested in the geovisualisation of historic environment data to an extent. In England, regional datasets at county and urban level, usually administered by the Local Planning Authority (LPA) and informed by Historic England as government advisors, take precedence. In Sweden, a national dataset is administered by *Riksantikvarieämbetet* (RAÄ), while the actual process of contract archaeology is overseen by regional executive arms of government (*länsstyrelsen)*. Case studies by the Society of Antiquaries of London (Andrews et al. 2020, 20), seeking alternative models of development-led management of the historic environment, have already set something of a precedent in this comparative approach.

There are also similarities in historic environment legislation that legitimise case studies rooted in the UK and Sweden, particularly in terms of the archaeological nature of what the historic environment entails and the notion of public benefit. The UK's National Planning Policy Framework (2019) indicates that an LPA ought to be aware of 'the wider social, cultural, economic and environmental benefits that conservation of the historic environment can bring'. In Sweden, it has been made clear that the government expects 'development-led archaeology to contribute to the advancement and distribution of new knowledge about the past' (Gill 2021). There are similarities in the gaps in legislation too, however. While *Kulturmiljölagen* determines that post-excavation documentation in a public archive is necessary, 'there are no detailed requirements as to what documentation has to be delivered in every case; it is very much up to the contract archaeologists to make the selection' (Löwenborg et al. 2021). In comparison, while the Chartered Institute for Archaeologists (CIfA), and LPA advice and requirements influence the deposition of historic environment documentation, there is currently no legal requirement to do so in the UK (Tsang 2020).

Comparison between the two states is further rationalised by the lack of clarity in what public benefit entails, and the frequency with which material from the historic environment forms the evidence base for digital exploration. How the products of archaeological intervention are inscribed digitally is of particular interest and is explored through Articles II and IV. Additional justification is provided by the state of the art in digitality. Both countries have been and continue to be fertile ground for digital applications, evidenced by early forays into modelling (Woodwark 1991) (see digital development), depositional practice (Larsson et al. 2017; Richards 2021), and developments in 3D modelling and museological praxis discussed in Article IV.

The persistence of the geovisualised archive of spatial data, in relation to the proliferation of virtual heritage techniques for visualising historic spaces, on urban or site level, offers the potential for a combined cultural approach to digitality in the heritage sector. Pursuing change of this nature would feasibly follow along the lines of 3D GIS usage, requiring little change at institutional level. However, understanding how they differ on a level more nuanced than simply highlighting the technological differences is needed beforehand. For example, it is not simply enough to envisage virtual heritage as a superior means of transmitting cultural heritage based on its greater visuality.

Stripping down the digital recording of historic environments to its embryonic stages, it can be related to the preservation of intellectual and cultural traditions that harken back to the mid-nineteenth-century concept of conservation of objects, buildings, and landscapes (Harrison 2013, 44). But where the planning paradigm is constant throughout the inventory process, virtual heritage models have branched out as scholarly resources, tools for tourism and public engagement, museum installations, educational and pedagogical tools, as well being used in films, television programmes, and video games. It is here within this divergence that the interest of this study lies.

Paralleling Shannon Mattern's (2016) aggregation of the histories of writing and urbanisation, in understanding the separate historical lineages of the exploration of digital heritage, I aim to offer the potential to enrich interdisciplinary approaches to knowledge contained within the broad framework of digital heritage. These possibilities lie within the recognition of knowledge production and the various intelligences developed by different experiences and mediums. As a call to fully utilise the potential of digitality, in his book, *E-Crit: Digital Media, Critical Theory and the Humanities,* Marcel O'Gorman describes the need to overcome predictable 'techno-bureaucratic culture' to focus on interpretation and invention (O'Gorman 2006, 11). While more closely associated with media theory, O'Gorman's critique is an appropriate descriptor for the mode of expressing the historic environment in

HERs, likewise his philosophy of 'the ethics of technological advances' (Bean 2019) is equally applicable. This pertains to tenets of inclusivity, participation and transparency at all stages. As 'urban and administrative culture are utterly dependent on nature, on geological resources' (Mattern 2016, 313), the geo-spatial database and the virtual depiction of the historic environment are utterly dependent on heritage and the social construction of meaning. It is the nexus of this meaning, and the epistemic creation and communication of meaning, that this thesis will examine and analyse within the domains of geovisualisation, virtual heritage, and digitality itself.

This comparative analysis touches upon several aspects of how the historic environment is experienced. Initially this is determined by the varying spatial functions and depiction. As indicated in the later section exploring the application of spatial theory, there are numerous ontologies of space and place – far more than are fully explored in this thesis. However, as a cultural dimension of how identity is linked to heritage, the focus on space and place in the historic environment is one of the primary facets of how heritage is encountered within the landscape paradigm. The differences between how this is remediated between geovisualisation and virtual heritage are therefore a valid starting point for the comparison.

Placemaking as a concept owes much to egalitarian developments in urban planning. In *The Death and Life of Great American Cities* (1961) Jane Jacobs encouraged cognitive ownership of the city through citizens' 'eyes on the street', highlighting the intricately interconnected relationships within the city that connect people to place. Similarly, William H Whyte showed that the unique strength of historic preservation and reuse was a desirable aspect and maintained that a level of discipline in city planning was part of the performative creation of social life in city spaces (Whyte 2018). In the broader sense of heritage as expressed through the historic environment, placemaking can be viewed as the process of spatial and socio-cultural interactions between people and place throughout the *longue durée* of its existence (Mosler 2019, 779). However, its potential application, limitations, and exclusions vary significantly between mediums. Despite this, the shared aspects of geovisualisation and virtual heritage, in terms of audiences and reception, also make for viable points of comparison. In light of this, there are a range of factors to discuss. This is foremost in terms of accessibility and the means by which the historic environment is made available, in terms of both utility and equity.

This also feeds the second aspect which is that of representation and identity, elements which are a major concern of heritage politics in critical heritage studies. In turn, this relates to the scope of this research, questioning the narratives of power involved in the performing heritage process in the

digital historic environment. Much is owed in the exploration of this to Laurajane Smith's *Uses of Heritage* (2006) and its establishment of the concept Authorised Heritage Discourse (AHD). The determination that 'the heritage management and conservation process is not only about the management of fabric … it engages in the regulation or "management" of cultural and social value and meaning' (Smith 2006, 88) is particularly relevant to the processes of archiving the historic environment. By comparison, virtual heritage often holds responsibility for an approach which is often seen as 'the innate aesthetic and scientific value and physicality of heritage' (Smith 2006, 87). The challenges that face both facets of the historic environment are therefore justifiably explored.

Finally, the line of enquiry is realised in relation to the 'CHEurope: Critical heritage studies and the future of Europe' PhD training programme (Bugalski and Guermandi 2019), to which this study is subordinate. In this context, utilising the gaze and literature of critical heritage studies, the comparative analysis is framed by how the digital processes in this thesis assemble heritage and the selective powers and politics that enable this in conventional heritage practice (Kristiansen 2019, 6). This is fundamentally not an attempt to label the virtues of what is good and bad practice, but instead to frame the potential for greater exploration of a heritage that reflects the society we all exist within. This is the foremost goal of understanding digitality as both a technology and epistemology for sustainable and accessible heritage transmission.

Development of Terms

There are evident differences from country to country, even region to region, as to how strategies for heritage management are manifested. Many of the differences are deeply politically and historically engrained in a sense of national state identity. Historic examples of how heritage and state affairs are frequently entwined are quite well substantiated in Scandinavian countries, based on the historic political rivalry between states. For example, prior to his appointment as *Riksantikvarie*, Johannes Bureus was afforded the equivalent of royal patronage to collect runic inscriptions with the goal of proving the antiquity of the Swedes. Parallel to this his Danish equivalent, Ole Worm, was similarly tasked, each attempting to support primacy over their neighbouring state (Carman 2015, 8–9). Similar indications of state interpreted heritage ideology are evident in Norway's *Kulturminneloven* (Cultural Heritage Law) (Klima- og miljødepartementet 1978), which only grants state protection to material produced before the 'last vestiges of an independent Norwegian state were cleared away in 1536–1537' (Øystein 1996, 51) in the creation of the Denmark-Norway union. It is often in policies such as these that the efficacy of heritage transmission via the historic environment is determined. Moreover, given differences in policy regarding digital accessibility and deposition, as well as the multitude of differing terminologies, it is often at the discretion of individual institutions to determine their interpretation, and respond accordingly. Fragmentation of this nature makes effective and broadly applicable analysis difficult.

While this thesis offers some specific examples via the case studies carried out, any generalisations are only loosely applicable beyond the UK and Sweden, especially since they are the primary adopters of the historic environment term. Given the variety of means through which heritage is substantiated and presented as commonplace in contemporary global society, it is equally only possible to offer general definitions of heritage. In view of these variations and generalities, it is important to offer a reflection on the terminology I use and how I use it for consistency and clarity throughout the compilation. It is in the adherence to these self-determined definitions that answers to the research questions are sought.

On Historic Environments

There is a great deal of the historiography of the term 'historic environment' that has been covered already in previous sections of the introduction. Yet, as pointed out previously, there are inconsistencies between practice and theory (Waterton and Watson 2013). The earliest realisation of the historic environment is far broader, encapsulating intangible aspects such as the overlapping themes of perception, societal meaning, and transmission of heritage, as well as the tangible relicts of the past (Baker 1977, 1–3; 1983, 27). Despite this, how it is regarded and interpreted in policy and legislation is far

narrower. The implementation of this can be problematic, particularly in the scope of this research. It is therefore necessary to address these issues and determine a definition which this thesis will follow.

How pervasively the 'historic' aspect of the historic environment functions in praxis has already been discussed. For example, Peter Howard (2009, 51), in highlighting that all landscapes are equally historic, argues that the use of the term encapsulates 'ownership of the concept, and the landscape itself, by a particular discipline'. Similarly, contentions have been raised in relation to archaeology's primacy in the historic environment, as well as in heritage in general. Archaeology's role in the discourse was heavily discussed in Emma Waterton and Laurajane Smith's (2009) *Taking Archaeology Out of Heritage.* In the responses to the arguments that heritage and archaeology have tendentiously become synonymic, it is highlighted that 'virtually whatever you think of as heritage can be interpreted through archaeology' (Newman 2009, 177). This by itself is not necessarily fallacious; theorising and thinking through archaeological lenses, 'whether social, epistemic or ontological … is not only the means for interpreting the archaeological record, and for the knowledge we create from it, but also for critically reflecting on the practice of doing so' (Pétursdóttir and Olsen 2017, 103).

Early survey programmes of English SMRs highlight that the archaeological recording process has engendered a broad and inclusive approach to management and policy, despite the frequency of unwieldy terms such as 'cultural resource', 'historic environment', and even 'heritage' itself (Baker 1977, 1–3). But while the result of extending the public impact of policy and practice has resulted in an open-access web-based approach to management (Newman 2009), it does not necessarily entail that this access is democratic or egalitarian. Nor does it offer much response to the notion that it leverages privilege over the development, disciplinary access to, and control over the historic environment record at the cost of other perceptions of heritage (Waterton and Smith 2009, 1–5).

Before considering the actively utilised definitions of the historic environment, it is worth briefly exploring the alternative terminologies that are useful but have yet to gain the same traction, or fail to adequately cover the ground, or both. 'Cultural landscape' is one such term, and one that I will use in this thesis on occasion. Its usage generally denotes a landscape where human works are of major influence (Howard 2009, 51). This, in my mind, is the landscape on material scale, i.e., the palimpsest of the physical remnants of past human interaction with space. However, not only does a fully theorised historic environment define more than space, but the intrusive nature of humanity has also essentialised all landscapes as being cultural in some way or another. The accumulation of archaeological strata is so extensive that it can be

broadly referred to as the archaeosphere, 'characterised by abundant inclusions of artefacts, manufactured materials, human burials, and the remains of domesticated species' and evidenced by the totality of ground modified by human activity on a global scale (Edgeworth 2018, 2).

Another term, founded as an analytical concept for assessing the heritage paradigm of heritage sites, is that of the 'heritagescape' (Garden 2006). This was born out of the need to recognise the heterogeneity within individual heritage sites, indicating the complexity in the construction of social space through 'the interaction and perceptions of individuals who visit the site' (Garden 2006, 396). The concept of the heritagescape factors in the recognition of the tangible assets as a baseline for understanding individual sites as single sites. By expressing sites as relative entities, a corpus for a larger conceptual understanding of heritage sites is built (Garden 2006, 397). The drawback again is the focus on the tangible element as well as the proviso that it may only be applied 'to places that are widely recognised as a marked-out space or site' (Garden 2006, 395). This is a particularly important stumbling block, not only making it difficult to apply on a large scale but also potentially failing to overcome contested space or space subject to the multivocality of heritage. Furthermore, the commitment to recognised space makes it difficult to distance oneself from the heritage discourse that 'privileges expert values and knowledge about the past and its material manifestations' (Smith 2006, 4), that could ultimately silence subaltern voices whose heritages are not recognised within the same space.

It is perhaps unsurprising then that in the lexicography of these various terms, historic environment still remains favourable, particularly in the UK. What remains to be seen is if its application and definition is universally or usefully applicable in regard to a broader heritage perspective. This is especially relevant to this research in relation to the reach of digitality as an epistemology as well as an accessible technological tool in geovisualisation and virtual heritage. As a framework, historic environment is intended to encapsulate natural and cultural aspects of landscape, and to endorse policy and legislature (Howard 2019, 17). It is apparent that its conceptualisation has broader connotations than archaeology, despite both fields being inherently interdisciplinary. Problematically, it is often applied and taken to be the same as heritage (Darvill 2009a; Waterton 2010, 181).

To examine the working definitions that are most frequently utilised, the UK's National Planning Policy Framework (NPPF) holds most weight currently:

> All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past

> human activity, whether visible, buried or submerged, and landscaped and planted or managed flora (Ministry of Housing, Communities & Local Government 2019, 67).

This definition is supported and validated by Historic England's adoption in kind. In her appraisal of *Politics, Policy and the Discourses of Heritage in Britain*, Emma Waterton (2010, 180) shows that within Historic England (formerly English Heritage), the historic environment is understood to be both a widely comprehended term, and one that is inherently inclusive. However, not only would I dispute the conclusions of the interviewees in Waterton's survey, I would argue that in adopting the NPPF this is a problematic position to take, given the lack of nuance and intangible foci.

On balance, interaction with the environment on an intangible cultural level is not explicitly disregarded by the NPPF definition. Despite this, its definition does not align with the remit of public benefit which this research seeks to explore. The value in the landscape as spelled out by the NPPF is largely binary in lending the majority of its attention to tangible material aspects of landscape. This presumes valuable utilisation on the same scale and extent in all social and historical strata. In these terms, the landscape itself is a material artefact in and of itself, assuming a latent value, rather than being a performative space through which human and non-human processes are integrated. If material culture is the archaeology's data as some have been cited as arguing previously (Kristiansen and Rowlands 1998, 2) then this approach not only champions archaeology's dominion over the historic environment, failing to attain disciplinary inclusivity, but also takes little phenomenological appreciation of the landscape into account (Brück 2005). Rather than embodying spatial narrative, the landscape is separated from 'memory, meaning, personal experience and identity' (Brück 2005, 47), becoming an immutable facet of reality, rather than an assemblage and space co-produced by human relations to natural and cultural objects (Tilley 1994, 17).

With the above in mind, as well as the spatial theory discussed in the Theoretical Application section below, it is prudent to offer a working definition of the historic environment as I will be applying it from here onwards:

> *The historic environment is an assemblage defined by a common, collective, and abstract space, wherein human actors interact with non-human places, objects, and things – where, indeed, heritage itself is negotiated. Much like the concept of heritage, the appearance of the historic environment is contingent to the means through which it is accessed, yet fulfils heterotopic criteria, in the sense that it is superficially resemblant of the spaces we recognise in the cultural landscape – but viewed through a lens of subjectivity, anachronism, and hybridity. There is nothing particularly historic about the historic environment. Rather than being bifurcated by material and*

immaterial, or tangible and intangible, or even past, present, and future, it is representative of a fluid space of contemporaneousness, liable to alignment with our own moveable values and societal structures.

Broadening the scope of what the historic environment entails in this manner enables a broader understanding of materiality. It also allows for greater diversity and consideration of intangibility, moving beyond empty platitudes and notions of heritage being 'for everyone'. As part of his critique of 'The Heritage' as 'the material embodiment of the nation's spirit' (Hall 1999, 4), Stuart Hall wrote of this form of heritage inevitably reflecting 'the governing assumptions of its time and context. It is always inflected by the power and authority of those who have colonised the past, whose versions of history matter' (1999, 6). In a British context, although more than twenty years have since passed, analyses of heritage audiences, practices, and practitioners reveal that heritage remains largely associated with ruling and middle-class white histories (Holmes-Skelton 2019, 370). Altering this dynamic is key to democratic and egalitarian approaches to heritage.

Digitalising historic environments is not necessarily the answer on its own as this process cannot be separated from cultural context. Nor does it ensure an automatic interactive and participatory heritage culture (Mostmans and Van Passel 2013, 80). What it does do, however, is blur the lines between institution and public, and user and audience. In personal, community, and local area archives, with the right orientation and mediation, the advancement of digital technologies strengthens the relationship between archives and the public and well as the network effect of the resource (Pruulman-Vengerfedlt, Runnel, and Aljas 2013, 19–21). The resource becomes more valuable as more user-consumers are consuming and producing in the same resource.

On Heritage and Critical Heritage

What constitutes heritage and for whom is a much discussed and constantly evolving discourse. Unlike historic environments, however, it is not a concept that necessarily needs redeveloping for the purpose of this thesis. More crucial is how heritage is related to the historic environment. As suggested above, it is not the same as the historic environment, though the two are interlinked. In some sense, there may be reasonable cause to consider the historic environment as being heritage layered onto place, which is presumably part of the logical process that has come to categorise the two concepts as one and the same.

However, viewing the historic environment as the space through which heritage is negotiated performs a distinct functional role. As discussed in Article II, the historic environment contains material yet to have been discovered, and therefore cannot be valorised to a greater degree than the

potential for heritage. The production of geovisualised gazetteers lends itself well to exemplifying the process through which associated records can be enrolled as part of a network in qualifying archaeological interest in plots of land. This is arguably one of the more effective HER mechanisms in terms of stewardship. However, one cannot fully justify the significance of an object in heritage terms without knowing of its existence, where specifically it is, or what, if any, cultural value it has.

While heritage studies has value as a discipline in its own right, heritage itself does not simply exist as a '*de facto* somatic phenomenon or social behaviour' (Russell 2010, 29). In the same sense that 'the past only exists insofar as it is remembered' (Assmann 2015, 115), heritage only exists in that it is validated, enacted, and negotiated. To paraphrase Smith (2006, 11) it is not a thing but the connection of value, meaning, and understanding as a product of human cultural practice, 'formed as a result of the relationships between people and other human and non-human actors' (Harrison 2013, 14). As a discursive phenomenon, it is an aspect of locating one's identity within narrative, connecting that narrative to past, place, and group existence (Rowlands 2020, 108). Thus, as a question of memory and group identity, it is a representation of a formative past (Assmann 2015, 115).

The concept of heritage is deeply relational and felt on both tangible and intangible levels. Anthropologies of intangible heritage are often described through performative or bodily practices, but are difficult to record, given their 'non-inscribed' nature (Connerton 1989, 4). But as Lynn Meskell (2015, 1) points out, it is still deeply enmeshed in material culture, and requires 'tangible places and objects' to 'mobilize identifications, significations, and memorialization'. There is also a cognitive sense of ownership or possession, to be retained, preserved, passed on and potentially augmented for future generations (Naguib 2015, 227). Emotion and affect are significant elements of heritage, particularly in terms of meaning and place making in a spatial context (Low 2017, 146), as is the therapeutic value, with particular recuperative potential when invested in the aspirations of post-conflict marginalisation (Meskell and Scheermeyer 2008, 168). Heritage is also heavily dependent on its value as documentation, and in many cases its economic value, particularly within the global heritage tourism market where significance is often measured by transactional, experiential, or consequential values (Baxter 2010, 249).

Heritage remains by no means universal, however. As well as the limited scope of audience, rights and access are contingent upon local and cultural understanding (Meskell 2010, 842). Constantly in negotiation, often between policy, practice, and performance, it is regularly subject to dichotomies of dominance and resistance. Like historic environments, heritage is tied to a great many legislations and agendas, which can be problematic given its propensity

for politicisation and plurality. Indeed, the very concept of heritage itself is a political one in its social construction; if we accept also that politics is a matter of expression, rather than a particular domain or realm. Politics can then be framed as 'manner of speech' that can take place on any level (Latour 2003, 145). In conjunction with heritage, the essence of political activity is born out of its mediation and the action of its presentation and re-presentation. It is partially through the politics of more representative heritages that the concept of critical heritage has been developed and articulated. This is based on the need for those in the field of humanities to nurture the epistemological frameworks that support inclusive conservational paradigms in response to the complexities of the lived conditions of humanity (Winter and Waterton 2013, 529).

One of the ontological factors in critical heritage studies is the creative potential that heritage offers in both the present and the future through the 'diplomatic properties that emerge in the dialogue of heterogeneous human and non-human actors' (Harrison 2015, 28). The notion of heritage as an act of diplomacy is an essential part of Harrison's (2013, 226) proposal for a dialogical model of heritage, 'which breaks down the conventional barriers between experts, politicians, bureaucrats and interested laypersons or stakeholders'. This requires what Emma Waterton and Steve Watson call a 'critical imagination' (2013) for determining the possibilities of theories *for* heritage through the critical examination and re-examination of theories *in* and *of* heritage. Within this frame of thinking, the 'material, social and cultural concerns' can be subject to new ideas and possibilities for looking beyond the 'things' of heritage as a process of decentralisation in order to better reflect the contemporary experience (Waterton and Watson 2013, 558). To some extent this involves following Bruno Latour's thinking in rejecting contrasts between modes of existence, not only the natural and cultural (Harrison 2015) but also the axiomatic contrasts between other cultures, Modernity and Western/European expression presupposed by past anthropological practice (Latour 2013, 13).

This occasionally means letting go of the familiar concepts of material objects and faithfulness to authenticity in the light of growing concepts such as 'cultural landscape, adaptive reuse, urban morphologies and the more holistic language of "place"' and the novel, alternative and unaccustomed techniques and processes that evolve with them (Winter 2012, 133). In light of this, critical heritage studies are a means of validating conceptual development in expanding the epistemologies of the heritage field in response to the new ideologies of globalisation (Winter 2013, 542). Therefore, while there is a temptation to associate archaeology or the material facets of human progress to be wholly consistent with heritage, this is not how I will limit myself to its understanding within this thesis. Nor, however, in keeping with the

complexities and contradictions of heritage, will I be dictating that the former approach is fundamentally wrong, at least as far as can be sustained within the socio-political framework of cultural heritage studies.

On Digitality

This section is not only intended to introduce the concept of digitality but also sets out my approaches to the subject within this thesis in detail. To that end, I will roughly bifurcate digitality into two primary focal points for the purpose of this study; an exploration of archival access through geovisualisation, and virtual heritage and its associated technologies. The former is characterised as digital heritage 'involving two-dimensional or use layered reality' whereas virtual heritage is 'typically three-dimensionally immersive, it contains both an element of spatial immersion and a sense of cultural inhabitation' (Champion and Foka 2020, 247). Just as vital to the discourse on digitality is the notion of an epistemology of the digital. Following Cecilia Lindhé (2013), this invokes '"the digital" as a lens', in essence granting new perspectives on both our own contemporary state and the past, potentially challenging or revising more or less taken-for-granted assumptions in heritage and the humanities as a whole. This does not result in the binary between tool and epistemic process, but the relationship between the two requires exploration for clarity.

Digitisation and digitalisation can be framed as a process of technological uptake. Following Fredrik Gunnarson (2018, 17), I too will draw the distinction between the two. The former can be considered the process of translation from analogue to digital medium, for example optical character recognition or the broader transformation of the SMR/HER to a geovisualised format (see introduction and below). The latter could be best described as the process by which digital objects, whether digitised or born digital, are utilised within the sphere of cultural heritage. This includes the reshaping of social, cultural, and political power through technology; the changing relations between community and institution engendered by digital access; the escalating use of digital tools for knowledge consumption and creation; and the visualisation and interpretation of heritage sites and historic environments (Cameron and Kenderdine 2007, 2).

Digitality, as a general epistemology, therefore, describes the framework through which I will be exploring the encounters with the historic environment and the latent connections to heritage. This epistemological approach bears resemblance to 'technicity', if it does not functionally operate as a subfield of it. This denotes technology as a 'mediator, not in the representational sense but in terms of its functioning: technology takes on ontological import in and through the forces that it exercises on other beings as well as in and through the new virtualities, and hence realities, it brings into being' (Hoel and van der Tuin 2012, 190). The relationship between digitisation, digitalisation and digitality

can be differentiated through the ontological status of digitality technology. Both digitisation and digitalisation substantialise the digital process via its implementation as a tool. By comparison, digitality focuses on the role of digital technology as a form of knowing and production, and as such requires theorisation into the complexities of its 'ethical, ontological and methodological shifts' (Bonacchi and Krzyzanska 2019, 1236). It is through these complexities that as scholars of digitality we must problematise the digital process.

It should thus be made clear that digital technology is not without its drawbacks and does not provide universal solutions to heritage issues. However, they importantly offer the opportunity for mobility, in the sense that historic environments and the networks of place and territoriality associated with identity and practice can be greatly extended. This is evidenced by the means through which digital technologies both maintain and produce heritage, with particular potential in respect to marginalised and minority communities (Christen 2005). This is not to be taken lightly, however, with critical approaches to digitality equally as pertinent to the wider spectrum of critical heritage studies. This, to paraphrase David Berry and Anders Fagerjord (2017, 103), would entail a critical digitality 'that continues to map and critique the use of the digital but is attentive to questions of power, domination, myth and exploitation'.

Digitality: A Utilitarian View

The digital influence over heritage, and the humanities in general, perhaps needs little introduction, given the rate at which it has proliferated since the 2000s. One could argue that the very nature of studying the humanities, including heritage, has been fundamentally altered by the rapid adoption of digital technologies and applications (Berry and Fagerjord 2017, 8). However, there remains room for clarity on certain principles. In a broad sense the 'digital' element refers to the technological lens one sees through when heritage is created, mediated, and disseminated, but there is still a great deal of nuance to an ever-growing field.

In investigating the digital making of the historic environment, it is evident that digitality too is rapidly becoming part of the familiar in a manner that is perhaps falsely represented by the black boxing processes of technology and presentation. As Chiara Bonacchi highlights, it is a 'pervasive' aspect of human culture, 'permeating academic inquiry, cultural industries and everyday life' (2021, 1). Similarly, Jonas Ingvarsson suggests that 'more or less *every* cultural artefact today is digitally permeated in one way or another' (2020, 2). The same can be said for the global landmass itself, taking into account the proliferation of satellite imagery, heralding the era of Big Earth Data. This is perhaps best exemplified by Google Earth and its profound intersectional impact, to the

extent that it has started 'to influence international relations and global representation' (Liang, Gong, and Li 2018, 92).

Parallels can be drawn to televisualised mediation; we see that contemporary society is highly compatible with media-saturated lifestyles (Hazan and Lobovikov Katz 2017, 551). This has a significant impact on how we understand the world, predicating what is by and large an element of cultural homogeneity. If we consider 'the false familiarity the small screen establishes between the viewers and the actors of big-scale history, whose profiles become as well known to us as those of soap-opera heroes and international artistic or sporting stars' (Augé 2008, 26) then it is perhaps little wonder that what can be considered a good television series is at the same time completely unrealistic but highly informative on the contemporary experience of life.

At the same time, we are still capable of recognising this as 'dissimulation'. It 'leaves the principle of reality intact: the difference is always clear, it is simply masked' (Baudrillard 1983, 3). However, in the effort to replicate historic environments via digital mediation, our mediated experiences are 'subsumed by the totalisation' (Hazan and Lobovikov Katz 2017, 551) of digital surrogacy as a form of 'simulation'. It is this totality that 'threatens the difference between the "true" and the "false,"' and 'the "real" and the "imaginary"' (Baudrillard 1983, 3). Thus, Baudrillard cautions that 'When the real is no longer what it was, nostalgia assumes its full meaning' (1983, 6). In heritage terms this edges closer to the realms of counterproductive and often dangerous mythologies and origin stories, particularly where digital mediation is concerned (see Mattioli 2014 for one such example).

It is, therefore, appropriate to exercise caution in regard to digitality and not to envisage it as a universal solution. How we appreciate and appropriate it in the heritage field is far from unproblematic. In discussing the turn towards Big Data ecologies in digital heritage, Bonacchi further notes that 'The abilities required to both craft and analyse heritage online have probably never coincided as much as they do today' (Bonacchi 2021, 3). Article IV highlights the problematic disconnect between the practitioners' heritage sector and the architects of digital environments. The 'general tendency to either abstain from or outsource the technicity of digital heritage research' (Bonacchi 2021, 3) is partially a result of practical hindrances such as a lack of technical ability, adequate infrastructural resources, or funding.

It is evident that technological developments have led to a vast profusion of data and resources. GIS and the multiple forms of visualising, documenting, and recording in 3D have all increased the sensibilities and variety of digital methods (Ingvarsson 2020, 6). However, users, particularly from a public

vantage point, do not necessarily have the expertise to navigate 'the new levels of uncertainty and bias' that digitality provokes (Harrison et al. 2017, 15). It is also noted that there 'is an inherent trade-off between technology and data potentially improving core infrastructure in society as well as standards of living, versus its provocation of deep social concerns' (Harrison et al. 2017, 11). In problematising the technological deployment of digitality it can be argued that 'a new class of expertise has emerged to create and manage … which can override the authority of local access and expertise' (Rico 2017, 218). Simply put, while technology gradually becomes more familiar, so does a new form of AHD (Smith 2006). If 'marginalized stakeholders, the nonexperts and local experts, are still poorly defined in heritage approaches in general' (Rico 2017, 218) then the rise of the technology expert only serves to further deepen the divide.

Digitality: An Epistemic View

There is no dearth of technologically focused papers in the field of digital heritage. One only needs to look at the proceedings from any given digital heritage conference. This is particularly the case for virtual heritage. While policy and legislation is a core premise of the reading of HERs, much of the literature regarding geovisualisation also examines how the technical aspects of the archives unfold. The issue is that these 'digital tools are leveraged to conduct heritage or humanities research without discussing the underlying ontological and epistemological issues at stake' (Bonacchi and Krzyzanska 2019, 1236). Hoel and van der Tuin (2012, 187) read into Ernst Cassirer and Gilbert Simondon's concept of 'technicity' as an ontological priority given to 'technology considered in its efficacy or operative functioning'. This reading highlights that the essence of technology cannot be grasped 'if we continue to approach tools or technical objects as if they were mere things' (Hoel and van der Tuin 2012, 190).

In similar fashion, digitality, as a specific facet of technicity, cannot be detached from the epistemological role it plays within the assemblages and networks it shares with human actors. Digital heritage still takes place within the familiar context of heritage production, which denotes 'any activity, occurring online or offline, as part of which human or non-human agents engage with the past' (Bonacchi and Krzyzanska 2019, 1237). Our understanding of this must involve both processes and outcomes, as well as the functional aspect of technology.

If, as Rodney Harrison (2016, 171) suggests, we see various kinds of heritage practices as 'enacting new realities through contingent processes of assembling and reassembling bodies, techniques, technologies, materials, values, temporalities, and spaces' then it is important to also recognise that these processes and outcomes are frequently blurred. Specifically, this requires the

recognition of 'ontological plurality' – i.e. the realisation that heritage processes not only enact different realities but also assemble different futures (Harrison 2016, 171). As a domain of heritage, digitality is no less a part of this. Given that the historic environment feasibly pertains to the majority, if not all of the domains of natural and cultural heritages, it is particularly relevant to critically understanding the epistemologies through which these forms of heritage become 'a target for more or less authorised and institutionalised practices of designation, collection, curation, maintenance and care' (Harrison et al. 2020, 5).

As digitisation and digitalisation practices remain an ongoing practice in realising the materiality of the historic environment, it is more urgent than ever to explicitly study the epistemological status of digitality. This entails seeing digitality as dictating the conditions for how knowledge is produced and presented; digital objects are therefore not neutral but instead are objects to think with (Ingvarsson 2020, 9, 17). If we seek to understand 'the world-making, future-assembling capacities of heritage practices of different kinds, and attending to the ways in which different heritage practices might be seen to enact different realities, and hence to assemble radically different futures' (Harrison et al. 2020, 6) then we must look to digitality not only *of* the historic environment but *in* the historic environment. To this end, digital interfaces are not merely tools or finished products but should be seen as productive meeting places (Ingvarsson 2020, 18) for the very social construction of the historic environment.

Geovisualisation

The historiography of archiving of historic environments has been touched upon in the introduction, but it bears out that the specifics of how these mechanisms are translated digitally ought to be defined for the purposes of this thesis. While the adoption of historic environment terminology has only relatively recently become quotidian, quantitative and computational techniques for archaeology have been in development since the 1950's (Djindjian 2015, 1). While it is difficult to obtain a consensus, SMRs/HERs began adopting GIS software on a broad scale from the early 1990's.[3]

In a certain sense there is a superficial resemblance to an 'analogue' approach recording – loosely referring to a map pin approach appearing to adopt a digital format for the same methodologies previously in use prior to the advent of GIS. The geovisualised method for mapping the historic environment represents far more layers than possible with analogue cartography, however. As a catch-all term for the methodology, geovisualisation generally encapsulates a deep approach to mapping,

[3] Mike Shaw, email to herforum@jiscmail.ac.uk, 6 August 2020.

incorporating layers of 'geographical, historical, archaeological, literary, philosophical, scientific, anthropological, sociological, and even theological data' (Foka et al. 2021, 203). In this case, geovisualisation often combines archaeological data, including records of interventions, with diverse resources such as historic buildings, historic landscape characteristics, geological data, historic mapping, as well as aerial photography, LiDAR data and paleoenvironmental data.

To some extent there is a McLuhanite element behind the process of translating the original analogue records to a geovisualised digital format, in the sense that not only does the medium change the mode of access, but it also changes the ways we perceive the data (Ernst and Parikka, 2013, 25). It is less about narrative or counter-narrative, and more about how the archive is conveyed and recorded – shifting the focus from the physical being within institutions, archives, and museums to access via everyday media environments (Ernst and Parikka, 2013, 17). With regard to how the archive is recorded, I am often reminded of conversations with Kristian Kristiansen, whose advice based on his own career in archaeological administration is that everything is to be kept, mistakes and all. This in effect asserts the historiography of the individual record and recorder, and exemplifies Derrida's aforementioned assertion the archive produces as much material as it records (1998, 17). More than that, however, medium-driven exposure creates mobility, but also theoretically allows the contents of a critically recorded historic environment to 'extend beyond the dogmatic borders of a supposed "national heritage"' (De Certeau 1998, 137).

The issues with archival approaches to the historic environment record are partly born out of precisely this – we have yet to fully achieve a widely accepted critical epistemology for recording the historic environment in this form. As Foka, Westin, and Chapman point out, the 'process of digitally rendering the past, indeed, ought to be documented, explicit and transparent in order to be scholarly validated' (2018, 10), which is a point we have not truly reached. The media memory developed as part of technological medium has already fundamentally altered human memory (Ernst and Parikka 2013, 69), yet it is still not used to its full potential. It is rare that one might find visualisations more complex and analytic than a LiDAR survey in a historic environment record, or even a sound file, let alone a 3D documentation in their GIS web applications.

There are evident and real limitations within the sector, not least surrounding funding and education. While the digital presentation of the historic environment is incredibly varied despite its longevity, and almost as a result of it, the digitalised archaeological date is at constant risk from lack of repository space, funding, and specialist knowledge. Furthermore, despite their

ubiquity (Internet Archaeology 58, Digital Archiving in Archaeology: The State of the Art offers a particularly thorough worldwide overview of digital archaeological storage (Jakobsen et al. 2021)), it remains a fact that 'only a handful of countries have repositories with the required specialist knowledge and mechanisms in place to ensure archaeological data will be freely and openly available for reuse by future generations of researchers' (Richards et al. 2021). However, there is still room for reasonable critique to engender technology-driven changes (Illsley 2019, 116–117).

Virtual Heritage

Virtual heritage is a term that is widely used but not always widely critically examined or problematised. In short form, it is heritage as it is actualised digitally, simulated using computer graphics technology (Roussou 2002, 93) – essentially the application of 'virtual reality and virtual-world technology to historical knowledge and to cultural heritage content' (Champion 2013, 271). This has commonly come to refer to the processes of recording, preserving, or recreating 'artefacts, sites and actors of historic, artistic, religious, or cultural significance' (Stone and Ojika 2000, 73). One issue with Stone and Ojika's definition, however, is its broad-brush approach. In using 'computer-based interactive technologies', geovisualisation could also conceivably be considered a facet of virtual heritage, despite often utilising very different methods and modes of knowledge production and display. While demonstrable integration with virtual aspects is possible (Campanaro et al. 2016), geovisualisation's attention is primarily 'visually enabled information retrieval and decision-making tasks' (MacEachren et al. 2004, 14). In comparison, virtual heritage tends towards experiential and phenomenological spatial exploration, and thus, from a performative perspective, it is valid to make a distinction between the two.

To clarify any doubt that surrounds the characteristics of virtual heritage, more complex definitions have been sought. Certainly, it is far more than the effort to create authentic digital facsimiles of objects or spaces long since passed. In reflecting this, Erik Champion (2013, 272) has proposed an alternative definition expressing virtual heritage's propensity for interpretation over preservation:

> virtual heritage is the attempt to convey not just the appearance but also the meaning and significance of cultural artifacts and the associated social agency that designed and used them, through the use of interactive and immersive digital media.

Although I am aligning myself with Champion's definition, I also include historic environments alongside 'cultural artefacts' as one of the representational aspects of virtual heritage. Place as a communicable aspect of the historic environment and its associated heritages is as much a central tenet

to virtual heritage as it is to this thesis, harking back to early forays in seeing and moving around in a virtual environment (Woodwark 1991; Champion and Dave 2007, 333). This is generally represented by spatial depictions that are the result of the translation of space in geometry, relying upon mathematical accuracy, watering down the experiential factor if not carefully attuned to human scale and social and cultural presences (Flynn 2013, 350). The latter perspective is only one issue critiques of virtual heritage are open to. Greater consideration to the wider issues will be given in the discussion.

It is important to maintain the differentiation between digital heritage and virtual heritage. While both make use of existing digital environments; create new digital environments, and co-create cultural heritage (Pruulman-Vengerfeldt et al. 2013, 8), virtual heritage is principally concerned with promoting sensory experiences by combing real and digital content (Rahaman, Champion, and Bekele 2019, 1). Digital heritage, while being a recognisable field, is not necessarily the same. Moreover, while it utilises cultural heritage, through audio-visual collections, geovisualisation, literary archives, museum repositories, and even blogs and social media, to name but a few, its general concerns are the broader trajectories of the digital turn in heritage studies. This sustains 'the articulation of linked but distinctive moments – production, circulation, distribution/consumption, reproduction' (Hall 2005, 117). Both fields signify the breaking down of the boundaries of the sender/message/receiver linearity by allowing for oppositional reading of the events that are supposedly 'signified and decoded in a negotiated way' (Hall 2005, 127). However, I propose that virtual heritage should not be read a subcategory of digital heritage, but as a distinct field focusing on the utilisation of visual technologies expounding the experiential and phenomenological paradigms of cultural heritage and the historic environment.

The principal technologies that this entails within the scope of the research question are augmented reality (AR), virtual reality (VR), or extended reality (XR) as an umbrella terminology. There is considerable variation in both the environments modelled in these formats, as well as in the methodologies for modelling them. Examples range from but are not limited to representations of the built environment utilising CAD combined with archaeological, photographic and topological survey (Rua and Alvito 2011); archaeological documentation derived from laser scanning presented in GIS (Dell'Unto et al. 2016); the translation of large-scale physical models of urban space into virtual objects (Guidi et al. 2005); procedural 3D modelling of cityscapes (Richards-Rissetto and Plessing 2015) and the generation of 3D models of monuments produced by photogrammetry/structure from motion (SfM) techniques (To, Nguyen, and Tran 2015) – a technology also utilised in the capture of data from maritime environments, alongside scanning sonar (Ní Chíobháin Enqvist 2018, 27–30).

How it is presented often plays an equally large role in how the aspects of virtual heritage are perceived. While there are wider critiques and criteria often required to achieve true environmental immersion, head-mounted displays, headphones, and haptic devices are often the typically considered devices for experiencing virtual reality (Granström 2013, 4) based on their accessibility. However, more expensive and specialised equipment is also in operation, such as the 'CAVE' computer-assisted virtual environment immersivity (Champion 2015, 62; Campagnol et al. 2020). Immersivity is achieved here through the projection of a virtual environment onto four, five, or six walls of a cube or the navigation of panoramic space through stereographic projection (Kenderdine 2016, 26).

At the other end of the virtual heritage spectrum is augmented reality, where 'human sensory experiences are changed or added to, not replaced' (Ellenberger 2017, 305). In general, this entails the superimposition of the visualisation and images of historic viewsheds, or the interpretation and reproduction of historic material, with the user's field of vision. The ever-expanding market for small, portable devices with high-end camera capabilities such as tablets and touch-screen smartphones is driving the augmented reality software market (Champion 2015, 72), with commercial products ranging from conferencing application to Snapchat and Pokémon Go (Ellenberger 2017, 305), evidencing that the technology is more customary than not in the consumer market.

In fully exploring virtual heritage as considered in this thesis, computer-generated environments as accessed through video games are also considered, based upon what Erik Champion (2008, 216) determines to be their adaptability and power in regard to audience and funding. Based on the similarities to the proliferation of smartphones, where non-ownership is now seemingly an outlying position, global statistics demonstrating the consumer uptake of historical games is also a viable line of enquiry into the efficacy of virtual heritage (Chapman, Foka and Westin 2016, 359). The notion of 'contextualising social, geographical and cultural aspects of the role of games in contemporary life' is particularly valid, articulating 'the dissolution of hierarchies between 'high' and 'low' culture' (Chapman, Foka and Westin 2016, 359–360) that fields such as critical heritage studies should be seeking to achieve. There are good arguments as to the critical capabilities of games, particularly in Erik Champion's body of work (2008, 2015), but although they offer the ability to challenge the dominance of quantitative digital processes in the digital humanities, it is equally important to recognise that they have their limitations (Champion and Foka 2020).

An Article Summary, in Brief

Ahead of the article summary, it is necessary to reiterate the line of questioning followed in this thesis in order to avoid ambiguity. Thereafter, the questions will once again be referred to in short form throughout the summary, i.e. Q.1, Q.2 and so on.

The questioning for the study of geovisualisation is as follows:

1. What happened to the records and field recordings that compose records of the historic environment in the process of digital expansion?
2. Following on from that, if there is truly the desire to overcome the flaws in current systems, how do we deliver genuine public benefit through geovisualised historic environments?

The questioning for the study of virtual heritage is as follows:

3. From producer to user, how does accessibility and its associated facets, including power structures, diversity and multivocality, impact the viability of virtual heritage as a gateway to encountering historic environments?
4. In hyperreal historic environments, what forms does authenticity take in virtual heritage and how do anachronism, accessibility and immersion contribute to this?

The questioning for the study of digitality is as follows:

5. Taking digitality into account, can objectivistic definitions of the historic environment as a material facet of the cultural landscape be broken down into more nuanced terms as products of space and assemblage?
6. In terms of performance and materiality, is it enough to consider digitality a tool to be utilised or should it be regarded as an epistemology that fundamentally influences the user's experience?

Article I: Problematising the Historic Environment Record: Comments on persistent issues in England and Sweden

This paper is primarily focused on the geovisualised domain of digital realisation of the historic environment. The goal was to clearly set out the terms through which geovisualisation was primarily utilised in England and Sweden based on contemporary practice and its historic evolution. Based on this target, the paper explicitly discusses the results of the digitalisation of analogue practices within the remit of the case study (Q.1). It is thus concluded within the paper that the utilisation of geovisualisation in this context renders

space as a fixed concept, focusing on communication of information rather than knowledge creation. Furthermore, along with the positioning of the HER in both England and Sweden, the potential utility of digitality has yet to be achieved. This is partly as a result of the historic development of the HER itself, but also due to longstanding issues of fragmentation, interoperability, and accessibility.

Through this study, the differing historiographies reveal the divergences in practices. Although both states have formative precedents in nationalist interests, the overall approach to access and aggregation has led to differing approaches to geographic division and institutionalisation, with regional and local government bearing the brunt of responsibility for stewardship in England. In comparison, although the administration of archaeological activity is handled regionally via *länsstyrelsen*, the geovisualisation of *in situ* archaeo-historic sites and monuments is the remit of the RAÄ. As a result, given the local network in England and the national focus in Sweden, the pathways to betterment vary from case to case.

As a paper charting the outcome of digital development of records, it is reasonably well placed to comment on the successes and failings, as well as plans for the future. In doing so, it tentatively implies that digitality in a broader epistemic sense functions as a solution (Q.2). While this is not cited in the text, it can be retrospectively framed in parallel to the work of Marcel O'Gorman (2006, 11), who depicts digital archiving as uncritical in its preference for easily digitally translatable, print-oriented material. Allocating georeferenced points on a map to digitised copies of site literature is testament to this. Thus, while the process is favourable to the bureaucratic elements of gatekeeping during the process of urban and landscape development, economic concerns, consistency and rapid data collation can be concluded to be prioritised over cultural gain. One of the paper's arguments is therefore that to deliver genuine public benefit via geovisualised historic environment datasets, this trend has to be reversed.

The paper further argues that in regard to digital development, Swedish practice has a better-defined plan, but the emphasis is still on the streamlining of the workflow rather than interpretative gain. The lack of local nuance still hampers its application in knowledge creation. In contrast, the fragmented nature of local HER access points in England creates a disjointed working practice, where individual records promote change, rather than following a top-down approach. The onus is on the profession itself, which poses difficulties based on the generally pessimistic fiscal restraints at local government level. Despite this, this can be said to have engendered what can be considered positive outcomes, most notably through the Know Your Place principle popularised in Bristol. While it should be acknowledged that more and more regions are taking this approach on board, even in the two years

since the article's publication, the general comment that these resources favour professional users in both contexts of the case study remains a strong conclusion about the development of geovisualisation in the historic environment.

Given the potentially universal applicability of the historic environment as a concept, regardless of which level it is taken up at, be it national, local, or individual, there was a necessity to examine the points of entry through which we access the recorded knowledge, data and/or information. On the principle that the geovisualised archival element of accessing this resource is one of the primary aspects in this thesis's digital comparison, it was necessary to highlight some of the *in situ* practices. As a result of the ubiquity of resources, it was not viable to carry out a study of a broader perspective, certainly based on the constraints of time, word space, and language constraints. This comparison has contextualised the dissemination process in terms of processing historic environment data.

Article II: Hybrids and Heritage Resources: Rethinking the social foundation of the Historic Environment

Tying in to the problematisation of historic environment records thematically, this paper is a means of understanding some of the discrepancies in access and usability that arise in the inventorisation of the historic environment. Whilst the previous paper was born out of a need to critically reflect on the policies and practices in the administration and stewardship of English and Swedish databases, the goal was to particularise the social foundation and relationships within the networks governing the historic environment and its associated records. The relevance here is largely belied by the fact that HERs as both public digital resources and as heritage networks were awaiting to be addressed in depth from a theoretical point of view.

In relation to the questions this thesis seeks to answer, as with Article I, this paper focuses on the geovisual aspect of digitality. While Article I focuses on the technological and material consequences of digitalisation, Article II attempts to articulate what happens to digitised translations of HER data on a theoretical level (Q.1). In a Big Data context, this could be summarised as an analysis of the 'role of emerging objects and processes in existing systems and using those same objects and processes in order to create new and purposeful forms of action' (Carter 2018, 1). In concluding that the performance of HERs from an actor-network perspective is a hegemonic process, that is biased towards the supply and input to and from professional users, the article provides a schematic for how many of the flaws have come about in reference to the solutions Q.2 aims to provide.

The article proceeds from the notion that access to the material in HERs, with no upfront costs to non-specialists, is tantamount to universal utility. As the historic environment has seemingly been co-opted by archaeology as a discipline, at least in practice, the current level of 'accessibility' has been cited in riposte to assertations that AHD is conspicuous within contemporary archaeological practices (Newman 2009). In response, the utilisation of ANT here is a means of explicitly staging the various relationships between user groups and emergent objects in the databases – concluding that widespread, digitally accommodated accessibility is a misconception at a theoretical level. As with Article II, this bears some resemblance to O'Gorman's stance, in that he argues that new media (digitality) has done little for the performance of humanities, aside from perhaps speeding up the hermeneutic process (O'Gorman 2006, 50). How the hermeneutic (interpretation) and heuristic (invention) is achieved is largely sidelined.

The goal was not in any way to delegitimise the role of archaeology in the heritage profession, and the conclusions of the article should be considered against the fact that from its roots in the SMR, the grounding philosophy of the HER was simply to create a descriptive record. As Kristian Kristiansen pointed out in the pre-defence for this thesis, it would be negligent and intellectually dishonest to deny this. There are however consequences to this. Firstly, while there are shared facets in the public psyche, archaeology and heritage are not necessarily synonymous. It is certainly not unreasonable to believe that there are many instances where social value aligns with the narrative governed by historic environment records, but this still fails to credit informal and unofficial engagement. As Siân Jones argues, 'expert-driven modes of significance assessment tend to focus on historic and scientific values, and consequently often fail to capture the dynamic, iterative and embodied nature of people's relationships with the historic environment in the present' (Jones 2016, 22). On these grounds (relating to Q.2), the article suggests that the functions of historic environment records, databases, and inventories can be challenged on the premise that they fail to fulfil a meaningful role to a non-specialist public.

In more conclusive terms (Q.2), the article indicates that the ultimate goal is to achieve an oligoptic space where consensus and knowledge are born (Latour 2005, 181), aligning with Ingvarsson's call for productive meeting places (2020, 18). A related critical reflection might be that by drawing together more disparate cultural resources in a bid to attain an oligoptic space, there is a need to view digitality as *both* technology and epistemology (Q.6). The article therefore determines that a process increasing public participation and bi-directionality of data flow, reiterating the success of Know Your Place, would engender increased public interest if more extensive uptake could be achieved. While the paper is in effect tracing the developments in and critiquing the consequences of the HER system, pushing for greater public inclusion to some

extent meets Daniel Carter's (2018, 2) call for scholars to steer the development of systems in novel directions.

In elucidating the networks that constitute the HER process, the utilisation of an actor network ontology not only sheds light on how the network functions in a social sense, but also allows inspection of the materiality of the network. As a result of the proliferation of digitality, digital entries into databases require recognition as objects with the ability to mediate human processes as any physical object of archaeological provenance might. Indeed, the archaeological object invariably forms some hybrid complex within the digital entry. However, by recognising the materiality inherent in the objects as hybrids, it also formulates questions into how these databases relate, not only to the physical landscapes, but also the qualitative data lost by giving primacy to landscape configuration of the historic environment.

An outcome of this is the formative basis for the line of questioning in Q.5. Based on archetypes of landscape archaeology, distancing restrictive conditions for defining the historic environment promotes the inclusion of a greater breadth of cultural material from the bottom up. Inclusion of broader cultural content in this vein, such as spatially oriented intangible practices or 'ways in which communities understand and value historic places … often rooted in oral narratives, folktales, genealogies and spiritual associations that generate specific, often localized, kinds of meanings' (Jones 2016, 24), may in turn allow for a more inclusive heritage-centred approach to the historic environment and its management. In order to do so it is necessary to move beyond the purely material expression of the historic environment as favoured by current policy. Similarly, a far-reaching effect of generating bottom-up heritage knowledge within the database is that the lack of localisation in the Swedish system of historic environment management becomes more apparent and all the more problematic.

Article III: Göteborgs Födelse (The Birth of Gothenburg)

Deviating from the format of the other papers, this article takes the form of an academic review of the *Göteborgs Födelse* (Birth of Gothenburg) exhibition, installed in the museum in 2017. Herein a digital model of Gothenburg, loosely set in the year 1698, is presented as a focal point of the exhibition. A critical aspect to the model was its narrative connection to *Göteborgs Födelse*, with the aim being to doubly review the practices of the museum, and also to contextualise the visualisation of the seventeenth-century city of Gothenburg analysed in the following case study (Article IV). Whilst this clearly does not constitute a general approach to the digital experience of the historic environment, the UK researcher Chiara Bonacchi (2014) indicates that the use

of online resources is a less common approach, compared to in-person visitation of museums and offline television viewing. Bonnachi's suggestion that digital novelties are not as universally effective as we might be inclined to believe (2014, 388) gave an opportunity and motive to examine this expression of a historic environment.

From a critical perspective, the review was undertaken to highlight this exhibition as an exemplar approach towards a more inclusive heritage within the city. This takes form in the reflexive approach adopted by the museum, which makes greater effort to cogitate upon areas of diversity, inequality, and multiplicity of narratives more pointedly in the city's past. However, a few words are required as to the role of Article III within the overall scheme of the thesis. As a review it does not necessarily make conclusions, aside from highlighting the disjunction between the exhibition's staging of the model and the content of the model itself. However, rather than removing the article from the compilation, there is a narrative surrounding digital approaches to museology that has value to be unpacked. The article is therefore a platform to stage the discussion of Q.6, highlighting the museum's utilisation of digitality as a tool, rather than a significant force for altering the perception of the city's narrative.

How digital models are embedded within exhibitions as part of the internal network and assemblage of the exhibition is in need of critical reflection in this context. In examples where this is part of the museum's ethos and formative structure it is understandable that the epistemology and conceptualisation are better developed. One of example of this is demonstrated by Stockholm's *Vrak* (Museum of Wrecks), the latest museum in Sweden's collective National Maritime and Transport Museums. Here, digitality is present throughout, evinced by photogrammetric 3D models presented in immersive media and via multi-touch tables, as well as presenting archaeological objects via holograms. Much of this is on the grounds of necessity. Marine historic environments require a specific and difficult skillset, and many objectives are irretrievable on the grounds of preservation (Vrak 2021). In this instance best practice idealises that wrecks and submerged artefacts remain *in situ* for the sake of their own longevity.

What is evident, though, is that digitality is constitutional in the *Vrak*'s formation and context, rather than simply deployed as a tool or novelty. It is deeply embedded in the process of revealing the marine historic environment, directly connecting the museum's own marine archaeologists account to that of the visitor. The process is made overt. While Article III evidences the participatory and democratised role in exhibition production in Gothenburg, in regard to the digital aspect of the exhibition, covert decision making created a disjunction between the exhibition content and the digital presentation. This is

reminiscent of the situation Joel Taylor and Laura Kate Gibson (2016, 412) describe where the 'decision as to what "heritage" is, and what is commissioned for digitisation (the encoding), is not necessarily a part of this democratisation'. Creative and political choices are made and through the museum backdrop are framed as both authentic and representative.

The disposition of this article is evidence that the digital itineraries of museum-based digital objects, be it as a digitally mediated artefact or virtual environment, 'remain far less problematized or researched than (say) the influence of physical (museum or gallery) environments on the conditioning of object narratives' (Dunn et al. 2019, 264). Furthermore, the need for further attributes is highlighted. Rather 'than simply visual data', metadata capturing 'other sensory attributes' (Dunn et al. 2019, 268), as well as paradata, documenting the approaches to decision-making, should be integrated as a matter of due process. In this example, it seems to be the case that digitality is carrying a heavy workload, unsupported by the necessary infrastructure – a characteristic of 'an implicit assumption that visual realism, immersion, and navigation are sufficient to simulate the past, and constitute a universal didactic method' (Pujol Tost 2019, 2:2).

This can be linked to the human interest in truth, particularly in the case of virtual heritage. This can be likened to Coleridge's (2004) determination that poetic faith requires 'willing suspension of disbelief for the moment' (Hazan and Lobovikov Katz 2017, 550). However, any suspension of disbelief must be attained by rigorous means, and not taken for granted through structural relationships and digital misrepresentation. Although the precise methods and process are not divulged in Article III, the discourse surrounding the deployment of digitality in *Göteborgs Födelse* opens the door for the discussions on authenticity and accessibility (Q.3 & Q.4) as more deeply discussed in Article IV.

Article IV: Digital Surrogacy: Politics and Aesthetics in Visualising the Historical Past of a City

This article covers the creation of *Göteborg 1698,* the visualisation situated within *Göteborgs Födelse*, with specific foci on the concepts of authenticity and accessibility. Access to the virtual historic environment, and the heritage impact of the model were analysed, focusing on the presentation and choices collaboratively made by the City Planning Department and the Museum of Gothenburg. There is a great number of scholarly contributions on manifestations of virtual heritage, but it is somewhat notable that where published, it is all too often the case that such publications limit themselves to describing the methods of development, and the features and user affordances of the completed digital product. The goal here was instead to produce a *post*

hoc scholarly critique in order to promote a more general proliferation of such approaches within the academy as well as providing literature to support the revisitation of the Gothenburg model as future funding may permit.

As more and more organisations look to digital tools and platforms to effectuate audience engagement, particularly considering the global COVID-19 pandemic, the paper assesses the challenges that have become inherent in trying to encapsulate a singular viewpoint whilst offering an exciting vision of the past. The local aspect of the case study made it possible to highlight some of the obstacles with virtual heritage. Questions of how to balance accessibility with novelty and nuance, and to reach a broad audience, have come to the fore in this article. When weighed against more general digital approaches to highlight a broader spectrum of issues, ranging from source material, creativity, adaptivity and interaction, Article IV argues that the spatial dynamics of power in the Gothenburg, and the branding and distribution of the city's digital surrogate may in fact counteract the accessibility to the historic environment.

Given that it is no longer simply possible to simply create a digital object and allow the novelty of its display mechanism to encapsulate a certain time period, to educate or even entertain an audience, this critique was carefully framed as a challenge for development rather than reproval. While avoiding the simplicity of McLuhan's (2010) determination that the medium is the message, practitioners are still bound to the endeavour of harnessing the potential of the digital medium, rather than taking its efficacy for granted. The key is change for the future of creative practice in virtual heritage, with an outward perspective of positivity for future iterations of models rather than restricting our viewpoint to seeing these facets of digital expression as the finished article.

To demonstrate this, in the period following the article's submission, an augmented reality walking tour has been created using the visualisation. This is a development of interest, given that much of the contents addressing power structures and accessibility (Q.3) take place via an in-depth discussion of digital placement and spaces of normative activity – a general concept consisting of sequences of activities of importance for individuals, including locations of workplaces, dwellings, and transportation systems (Ellegård 2019, 4). *Göteborg 1698's* realignment with mobile digital technology offers something of a gateway to a bodily involved practice, though no analysis or reflection of how and whether it fits with the scope of normative activity. Where this is achieved but in the context of one-off, or brief periods of digital installation, the sustainability and usefulness of digitality are negatively impacted.

Another subsequent development is that the immersive virtual reality

display has been removed from the museum entirely and is now to be found in the tourist information office. The reasoning behind the deployment of the VR installation is difficult to understand. Simultaneous deployment in museums alongside neoliberal practices, uncritically combining digitality, tourism, and profitable deployment of digital surrogates, runs the risk of the digital process being driven more by businesses than heritage consumers (Jones 2014, 192). Novelty and effective communication mean little without an understanding of the reasoning behind successful user experiences. Laja Pujol-Tost highlights the potential components of effective VR-mediated experiences:

> storytelling, human presence, social exchange, free exploration and control, intuitive/meaningful interaction, immersivity, embodiment, multisensory realism, visual augmentation, content meaningfulness, content accuracy, representation of daily life, and sense of place (2019, 2:4)

The aspects of meaningfulness, representation of daily life and sense of place make it difficult to conceive of why this material is augmented towards visitors rather than residents. It is on that basis that the balance between technological utilisation and epistemological process must be considered in relation to *Göteborg 1698*.

To add to the disruption between place and population, authenticity in digital surrogacy (Q.4) forms an essential part of the analysis. The article demonstrates the disadvantages of ocular centric virtual reality by seeking high resolution as a means of achieving immersion and cultural presence. Besides that, source material as active archives is critiqued, highlighting the need for academic rigour and transparency with the user in regard to the real and unreal. Article IV argues that in this context, incontestability and immutability were set about by the enrolment of the institutional power that museums have over knowledge. While the London Charter and the Principles of Seville are designed to help mitigate misrepresentation and mediate audience expectation, there is no requirement for their implementation. As one of the vital stances Article IV takes, the lack of their implementation often negatively impacts audience preparation and leads to a false sense of historicity and fact formation.

Conclusions

Clearly, there is a great deal of variation in how we practise, recognise, recall, and retell heritage. Even with something of the nature of inventorisation, wherein standardisation, datafication, and performative practicalities are the call of order, there is a great deal of divergence in presentation, practice, and policy, as we see in Articles I and II. To complicate matters further, then, exploring heritage as expressed through digital historic environments, whereby local context, indeed the very things that engender unique identities and sense of place, vary to an uncountable degree, make such expression all the more difficult through comparative analysis.

As wide ranging as heritage is, the following conclusions can be drawn in the domains of geovisualisation and virtual heritage, despite the cultural and practical divergences:

Geovisualisations

The primary focus of the geovisual line of enquiry was (Q.1) the outcomes of digital expansion in terms of impact upon the records and field recordings that compose records of the historic environment, and (Q.2) how those outcomes relate to the public as beneficiaries.

Articles 1 and 2 both lay out an ecology of the digital realm of historic environment records, which the latter approaches on a more theoretical basis. What is evident is that for the most part, while technology has changed, the epistemic aspect of recording and delivering historic environment data as a process of valorisation, rather than simply as data, is still rooted in a phase of integration. Although the policy and surrounding legislation have their flaws and ambiguities, in principle the age of digitality should be indicative of a phase of valorisation where egalitarian access across the full spectrum of society is a primary goal. As much was described and somewhat accurately predicted by Paul Gilman in 2004. He indicated at the time that the transition between SMR and HER was an ambitious project, hindered most probably by financial resources as well as the uneven pace and *ad hoc* nature of progress (Gilman 2004). These ambitions were highlighted by a clear structure for benchmarks of best practice (ALGAO/English Heritage SMR Working Party 2002). While this has since been superseded by *A Guide to Historic Environment Records (HERs) in England* (Tait and Wallace 2019), many of the provisos for what a HER should be used for coincide.

Rather than unifying across-the-board uptake of these benchmarks, engendering 'a two-way flow of information between SMRs and local people' (Gilman 2004), there is instead an apparent dependency upon a particular

understanding of heritage and materiality firmly entrenched and established within the mindset of contemporary heritage sectors. Despite the theoretical developments of the last three decades or so, it seems that 'big concepts', exemplified by identity, authenticity, or dissonance (Waterton and Watson, 2013, 456) have seemingly done little to permeate the everyday institutional practices that shape heritage inventorisation and to some degree digital visualisation. While there is a necessity to remain mindful of the nuances and modalities of heritage, there remains, not only a sense of universal heritage suitability and interest based on age and appearance, but also an increase in the commodification of heritage as a resource.

Arguably, where databases are concerned the 'conventional' approaches to heritage prove to be more resilient than in the field of digital visualisation. Where policy is rooted in much earlier ideals, such as that of inventorisation, as shown in Article I, there is often a failure to acknowledge the changing makeup of society and representation in contemporary heritage politics. As a result, there is often a fixed truth or perspective that organisations seek to maintain. That being said, although critique of historic environments records is valid and often underrepresented in academic literature, it is important that this is tempered with certain elements of reality. As a resource, the principal goal is to be the evidential foundation for more qualitative evaluations drawing other types of information and contexts into play. This makes it more difficult to justify criticism of the record for a role it was never intended for. However, while this may be true for a newly inaugurated system, the HER as a concept is approaching the end of its second decade and many of the functions the transition from SMR to HER intended to achieve are only sporadically fulfilled. It remains the case that 'social values are fluid, culturally specific forms of value embedded in experience and practice' (Jones 2016, 22) in contemporary communities' attachment of significance to the historic environment. The desire for unambiguous stories of the past, connected to a universal truth, is largely a take it or leave it offer. As a result, folklore, fabling, and alternative histories are not well expressed in the geovisualised transmission of historic environments.

Technology is no longer novelty enough that its performance in the historic environment should be limited to speeding up decision making. In supporting me writing the proposal for this thesis, David Hopkins, county archaeologist at Hampshire County Council, considered the phenomenological factors of knowing to be of critical importance. He often spoke in Rumsfeldian fashion of 'known knowns', 'unknown knowns', 'known unknowns', and 'unknown unknowns' in our encounters with historic environments. The status of knowledge not only offers a frisson of experiencing the past when *in situ,* but also provides the starting point for the quest for greater knowledge. Rather than forging a radical solution, we ought to focus more on the existing process

of mobilising databases as a means of producing deeper meaning and experiences embedded within the historic environment itself, rather than behind a computer screen.

It is clear enough that to mitigate the physical impact of development in the long term, LPAs are often best placed to house HERs institutionally. However, it remains to be seen if and how they intend to best interact with community voices. This also raises the question of how such resources deal with identity on both a local and a national scale. The sector itself needs to take more initiatives if a HER with a broader cultural scope is to be attained. Part of the issue is the panoptic position LPAs and RAÄ place themselves in, which, while operating as a gateway, often disguises the process of valorisation and hinders public participation. There is also a greater need for actualisation of human processes. How then to further the prospects of deeper engagement with digitality as a means of audience engagement? Simplistically one could suggest that if the city is an archive (De Certeau 1998, 141), then the goal here is to make the archive more like the city. My intention here is not to replicate the ocular centric modes of virtual heritage. While technology allows for 3D representations in GIS, few represent the scale of placiality, focusing on the spatiality of sites. Furthermore, the institutions housing HERs capable of supporting this are fewer still.

Disassembling the hegemony of HERs and reproducing the content in kind alongside separate broader cultural databases within local cultural centres such as museums, libraries, or learning centres may represent one such option. In essence, it is necessary to find a means of 'unveiling connections between community and the neighbourhood' (Harrison 2011, 95), reinforcing the connections between people and place. In the digital realm, this form of action is deployed by the Know Your Place initiative, retaining community values of heritage in relation to space and deploying it alongside the established HER format as a hybridised local social/local government geovisualisation. In the short term, this hybrid format holds currency with the public and professional sector, but wider uptake is needed if it is to have a more significant impact.

Virtual Heritage

The line of enquiry in the domain of virtual heritage seeks to determine (Q.3) how power structures, diversity, and multivocality shape access to historic environments through the lens of virtual heritage. Complementing this is a line of enquiry (Q.4) that grapples with the role of accessibility as well as anachronism and immersion, in forming authenticity in virtual heritage.

A conclusion drawn from the sum of the thesis would be that in regard to accessibility, the role of digitality in connection with the context of both museum and urban space must be understood as a fractal part of a wider

assemblage of the city as a social entity. The epistemic impact of digitality is hard to predict if its technical elements are not embedded in both space and praxis. Pedagogical approaches, as well as hermeneutic and heuristic possibilities are limited if the means of production and presentation are critically neglected. Key to this is finding a means of nurturing access for a wider spectrum of society, and not just a privileged bubble in central spaces. Critical reflection on the placement and integration of digitality is fundamental if digitality is determined to be a viable tool for accessing the historic environment. This is certainly the case if RAÄ, for example, declares that 'the vision for the cultural environment is that everyone regardless of background, experiences their claim to the cultural heritage that shaped Sweden'[4] (2016, 4).

Authenticity in relation to userhood and anachronism is especially problematic. Visualising the past frequently relies on the voices of the past, frequently in the form of the *flâneur*, whose role was to mediate between social truths and the reader, leaning upon an innate sense of superiority that places alterity between oneself and all others (Epstein Nord 1995). To some extent this is mirrored in individual explorations of virtual environments – a line is drawn between the user and all other users. The anachronism of the user renders the entire experience exotic or ephemeral, enabled by the novelty of time travel and technological mediation. Functionally, however, this erases the role of gender and otherness in the virtual experience. Class demographics are particularly important, particularly given the historic middle-class anxiety about the presence and visibility of women in the street. Being seen on the street as a woman essentially allied the very concept of female presence to unsanitary conditions and moral ambiguity (Epstein Nord 1995, 9).

Being seen, accordingly, leaves us with the paradox that to create an authentic historic environment we must problematise the status and being of the user. This is best discussed in relation to Johanna Drucker's *Visualization and Interpretation*, and her discussion of how interfaces mediate the process of transaction and exchange of identity. She argues that despite identity being structure in relation to scale and digital objects, 'individual users are barely aware of the way their identities as information personae are being constructed' (Drucker 2020, 61). Critical investigation and reflection is required to maintain consciousness of the self when the experiential design of virtual space is focused on 'wandering, browsing, meandering, or prolonging engagement' (Drucker 2020, 65) in a historic environment.

Another conclusion to be drawn from Article IV indicates that there are still numerous examples where opportunities to be critical and reflexive have

[4] Author's translation

slipped through the net in the creation of virtual heritage. It varies from case to case as to whether this is a result of lack of adequate understanding or theorisation of heritage prior to designing a digital surrogate for a historic environment; insufficient auditing and assessment of resources; or because of lack of a combination of expertise, tools, funding, and technological limitations. In many instances, however, the result is the same, namely, a failure to overcome monocular views of heritage narratives. Great care is required to avoid reinforcing grand and uncritical narratives, and while up until recently 'cultural heritage digital initiatives have often been overtly driven by technological possibility, rather than societal need' (Taylor and Gibson 2016, 413), in this context, there remains an element of digital utilisation for the sake of following technological trends in the museum sector

Finally, Article IV alludes to an element of belief that an archaeo-historical visualisation is a means to ends through its presentation. Whereas the inventory approach commodifies heritage through its utility within the planning and development industry, the digital historic environment has become commoditised in its own right, often being marketed and sold as product for the sake of profitability, rather than the furthering of local heritage perception, place-making, or the betterment of well-being.

Comments on the Broader Domain of Digitality

The conclusions above have in many respects offered answers to the lines of enquiry dealing with geovisualisation and virtual heritage. However, they have left questions regarding the broader domain of digitality largely untouched. In terms of (Q.5) breaking down the material facets of the historic environment and (Q.6) opening the door to a discussion of the dynamics of digitality, they perform as a platform for the wider discourse within this thesis. In this sense, along with the Theoretical Application section above, it provided the foundational research for the alternative definition of the historic environment offered earlier. Furthermore, in accessing the case studies and gaining understanding of the practical utility of digitality in HERs and museums, they also allowed the development of the discussion of the epistemic approach to digitality above.

There is much more discussion to be had around the subject, particularly in relation to the use of digitality in the broader heritage sector across a range of representative cases and concepts, which takes place below. In brief, however, many of the shortcomings are connected to the notions of authenticity and materiality, particularly in terms of truth and narrative when related to sense of place and heritage. Arguably, the means to negotiate this are available, and have in certain examples become fruitfully integrated into current practice. The

disconnect between the plausibility and possibility of utilising these means of communicating heritage through the historic environment is more complicated, and perhaps too general to give specific comments without further analysis.

This being said, I believe, as a result of both the production of this thesis and in my previous role, that the potential for critical cultural heritage approaches to heritage making in historic environment management is impeded partly by the lack of a specific route for qualifying for such positions, and partly through the policy, funding, and configuration of the networks in place.

Supplementary notes

Limiting the boundaries of the line of enquiry to case studies in England and Sweden formed what I hope has been an interesting and valid comparison. However, not only were these boundaries framed largely by state or local government practice, they were also fixed largely within the archaeological domain which has come to dominate the historic environment sector. Given the variety and depth of digitality as a global practice, there is clearly more to be said on the matter beyond the confines of my comparative enquiry. On this basis, there are grounds for a broader discussion, incorporating wider practice and reflecting on international and interdisciplinary digital, social, and conceptual foci.

Sociology, urban planning and human geography are just a few of the interdisciplinary fields that can inform the manner which we cohabit with the historic environment. The vitality of the historic environment depends on its relation to people, both living and dead. Without them the network of relations and power of meaning making falls inevitably short. Although he regards it as a somewhat sterile terminology, an unpeopled historic environment can be compared to Richard Sennett's analysis of the 'built environment'. Focusing particularly upon urban settings, he draws attention to the historiography of the French terms *cité* and *ville* (2019, 1–2). On one hand, *cité* has alternated its meanings, from a particular place, to the character of life in a neighbourhood, to simply the flinty liminal spaces on the peripheries of settlements. On the other, *ville* is often used to refer to the city overall. This, however, is considered by Sennett to denote more than simply the urban shell of city as buildings are not isolated facts but subject to the urban dynamics of their context. Similarly, *cité*, at least as it has previously been used, draws a distinction; the structure of the urban space is one thing, dwelling in it is another.

As a comparable English term, 'built environment' often only reflects the economic or political structures of the planning process, rather than the assemblage of the human and non-human networks that produced it. What it is might be better understood as would be a seamless combination of *cité* and *ville*. If we think in these terms regarding the historic environment, then there are parallels, given that its being is often subject to the whims of the planning system, policy, and legislation as a commoditised resource. If we were to perceive the terms more broadly, perhaps as a seamless combination of 'pastness', 'heritage', and 'place', then it may be possible to overcome the contradictions and biases in the mechanisms through which we encounter it.

The historic environment in terms I have earlier described is particularly fluid and abstract, which was my intention for the most part. The goal was ultimately to portray the qualitative nature of how we perceive place in relation to history, space, and social context. In particular, I wish to highlight that the

nature of the historic environment can at once be subordinate, complementary, and completely distinct. It is not monocultural, thus it should not be managed and communicated that way. This thinking was behind the inclusion of Article III. With further regard to Article III, the intention is to show that the work of 'analogue' museology has grasped the critical nature of space within a historic environment, and that while there is often a shared history of the event that formulates space and place, the reality of the cumulative experience by its publics is completely heterogeneous and contingent upon numerous factors, including one's sex, gender, ethnicity, class, and social status.

This was as valid in the past as it is in the present. To elucidate, in Early Modern Sweden, one can conceive that heterogeneous power-knowledge networks, establishing the hegemony of the inhabitants, provided the spatial syntax for how the urban landscape was perceived. The way in which the material structure of a settlement like Gothenburg was shaped by the opportunity to start anew on a Dutch model, can be compared to older towns like Stockholm. In the older towns the conflicts were driven between development propelled by the Crown on one hand, and the obstructions presented by the burghers and the local authorities on the other (Tagesson 2017, 134).

Subject to the Crown of Sweden, Gothenburg was of course subordinate, yet the perception of Gothenburg as an individual urban environment is far greater than simply a part of the Swedish overarching historic environment. We can come to understand this through gestalt thinking (Næss 2005, 119–120; Markevičienė 2012, 77). This form of perception is often introduced as the whole being greater than the sum of its parts, but in this ontology, a part is more than a part and to call it such is misleading. Much in the way that fractals can be synecdochical for the whole, we should instead conceive of such things as subordinate gestalts. An individual neighbourhood is distinct in its own right, and to experience it is more than simply be in a part of a city or town. The same applies to historic environments. While there are divisions and fragmentation in terms of management, as shown in Article I, there are no such structural relationships or boundaries to how this is perceived in actualised space. Furthermore, historic environments as abstract and contingent spaces have no absolute shape or primary quality, they vary with perspective (Næss 2016).

In these conceptual terms, the historic environment offers vague resemblance to the Christian Norberg-Schulz' *genius loci* (1980). As a form of intangible heritage, *genius loci* broadly denotes the spirit of a place, residing 'in the environment of the setting' and 'bringing it to life as a dynamic living place, working place, or inhabited landscape (Passfield 2005, 20). Markevičienė (2012, 77) characterises *genius loci* as being both a reality and an entity, forming a

touch of eternity; a measure of wholeness, complementing both the whole and its constituents; continuousness, non-evident, and being socio-culturally rhizomatic. This not only makes the notion of preserving *genius loci* difficult but reproducing it even more so.

Given that there are many shared characteristics between the terms, digitally reproducing an inclusively conceived historic environment is incredibly troublesome. Within this section, I will discuss the digital mobilisation of historic environments, tying it to the general line of enquiry through the broad categories of spatiality, accessibility, and authenticity. In this manner, the following discussion supplements the article case studies with the consideration of how the vitality of digitalisation is expressed in geovisualisation and virtual heritage on a wider scale.

Accessibility, Equity, and Representation

A topic discussed throughout the compilation of this thesis is accessibility. In human terms, what I am referring to is the availability of heritage products and resources across the spectrum of professional status, class, ethnicity, age, and gender, and so on. It is clear that digitality and digital technologies have raised the bar in terms of empowering access to heritage, to the extent that as far back as 2013, Ch'ng, Gaffney and Chapman considered the digitality to be representative of a process of democratisation (Ch'ng, Gaffney and Chapman, 2013, 358). While I disagree that this has been achieved absolutely, as I will discuss throughout this section, there is an element of truth to this. Access to technology, particularly smartphones, tablets, and home computers is prevalent in contemporary society, all of which mediate access to forms of digitality, both geovisually and virtually modelled. The latter aspect is also a paradigm in the ever technologically expanding video game industry, particularly through the visually impressive representations of past historic environments presented by high-profile games. Furthermore, the advances in consumer AR and VR units, spanning from standalone devices (Microsoft Hololens, Oculus Quest, Vive Focus), desktop and console ready devices (Oculus Rift, PlayStation VR, etc) and smart phone ready devices (Google Cardboard, Samsung Gear, etc), all represent the beginnings of a broader heritage ecosystem (Champion 2019, 348–350).

Mobile Historic Environments

Smartphones and tablets are often cited as a means of 'humanising' place (in the vein of Norberg-Schulz 1980), particularly through AR, and its offer of the opportunity not just to visualise what is not present, but also to provide alternative commentaries to expose histories of minorities and disenfranchised groups (Westin, Foka, and Chapman 2018). While AR and to some extent VR applications are more commonly associated with smartphones and tablets, mobile operating systems are now capable of collecting and displaying geodata of a complexity previously only achievable with a desktop processor (Önal

2007, 50).

There are now numerous operators offering national or regional level applications, with just a few examples including English Heritage's (2016) Blue Plaques app; *Fornfynd*, a third-party app (Tinybird Interactive AB 2017) that duplicates RAÄ's *Fornsök* database for mobile devices; or the now defunct mobile OS version of Gothenburg's *Minstad* (Göteborgs Stad 2012), an annotated geovisualisation allowing denizens to interact and comment on planning and urban issues. It has also proved possible to create relatively simple geovisualisations of historic environments, utilising Google Maps' platform as a means of enhancing user experience of sites of heritage sites, such as Lawrence Shaw and Keith Challis' landscape study of Stonehenge (2013). These applications are far from the convention and still have drawbacks, for example the reliance on .CSV files rather than dynamic access to an external database. In the Shaw and Challis case, this is provided by the Archaeology Data Service, which strictly speaking determines it to be a representation of the archaeological landscape rather than the historic environment.

As Shaw and Challis point out, there are advantages to this, such as improvements in the speed of the app processing time, as well as making a network connection inessential by embedding the data source internally within the app. By minimising the need for data exchange over the network, user interfaces can be simplified, and mobility and data access maintained (Ancona et al. 2008), particularly useful in remote locations with patchy access to mobile data networks. However, there are downsides to the .CSV approach, and in the Stonehenge example a distinct lack of information is given, aside from the record name, ID, and its location, both as Eastings and Northings and as a pin distribution on the map interface. This, as Denis Byrne points out, dichotomises heritage data by mapping 'cultural sites as dot point data … to emphasise their historical associations over their contemporary human associations' (Byrne 2008, 259).

Heavily abbreviating knowledge with the aim of overcoming network and performance issues is reminiscent of what Latour calls 'double-click' knowledge (as discussed in Article II), highlighting the fetish of producing 'free, indisputable, and immediate access to pure, untransformed information' (Latour 2013, 93). He uses the example of the voyages of Jean-François de Galaup, comte de Lapérouse, and his advances in scientific inscription to demonstrate the need for valuable inscription procedures and cognition. This is what Latour terms as 'immutable mobiles' – 'immutable because they keep some types of relations intact, mobile because of the way they circulate, allowing new translations and articulations to take place' (Wickstead 2009, 255). Latour (1986, 6) states:

> The essential characteristics of inscriptions cannot be defined in terms of

> visualization, print, and writing. In other words, it is not perception which is at stake in this problem of visualization and cognition. New inscriptions, and new ways of perceiving them, are the results of something deeper.

The search for information must return with 'things', but 'things' robust enough to be related to others, returning inscribed objects 'which have the properties of being mobile but also immutable, presentable, readable and combinable with one another' (Latour 1986, 7).

In other words, they must be understandable and useful to more than just the individual if they are relayed in a culturally meaningful manner. I maintain therefore that simply being free and available online is not the same as promoting democratic or equitable access to the historic environment. The question of whether this is doable is another matter, certainly on a wide scale. On a small scale, the turn to participatory processes such as the Know Your Place movement appears to have some success. So does the process of countermapping, which is often considered to be a means of attaining greater success in representing the worldviews of Indigenous and marginalised peoples.

Historic environment Stewardship

Articles I and II attempt to articulate the dynamics of accessibility, or inaccessibility, in geovisualising the historic environment as apparent in the stewardship of archaeological resources and historic environment records. As means of heritage communication and place-making, my argument here is that stewardship of the historic environment is most effective when the goal is to inform and empower. Functionally this would provide the means for the public to make distinctions between heritage, myth, and misinformation. As a method used to deliver public experience, geovisualisation of historic environment data demonstrates the basic principle that the primary dynamic of understanding the past is knowing about the past. Yet there remain a number of challenges, for example how best to provide information to the public as a means of understanding the historic environment, be it on their doorstep or in a separate country or continent. This includes broadening the access to material, as well as broadening the scope of the material included.

The openness of aggregating services like the Heritage Gateway, or even web portals linking directly to individual historic environment records only works if it has a large enough presence in public awareness. Despite this, at the time of publication, I show (Article I), using data from the Historic England and the ALGAO UK HER committee annual survey, that there remain HERs that are resistant to online access and numerous institutions that have no policy of analysing online activity (Illsley 2019, 128–129). Making heritage accessible requires stewards to provide stakeholders and users with the intellectual tools to interpret heritage for themselves if they are to be empowered. This requires

forethought as to how people might potentially use the information available to them. As Sennett states, all innovations 'suffer by definition from a mismatch between the ways people currently do things and the ways they might do them' (2019, 14). As part of the planning system it is desirable to minimise lacunae to broaden protection, but because of the formulation of records, the primary goal is synthesis and aggregation through a gazetteer process, rather than heritage and place-making narratives. This inherently favours the specialist community, rather than a non-specialist public (Article II).

It could then be argued that as there are also multiple museums, family, local history, and archival sources where people can access heritage, as well as academic databases and records of grey literature and reports, there is no necessity for HERs to overcome their limitations. Not only does this fail to consider the potential for these resources, but it also maintains the fragmentary divide between the cultural and planning sectors. That is not to say that being tied to planning does not have its upshot. While electronic memory has appreciated incrementally, now considered both global and beyond 'mere material extension or surrogate' becoming 'a seemingly independent entity' (Gabrys 2011, 107–108), maintenance is still a requirement. Thus, compared to the fragility of the cultural sector, the planning sector arguably represents the best source of longevity. Problematic symptoms persist, however. The cultural contributions of the planning sector are then limited to the products of archaeological intervention and mitigation, curtailing the activity of HERs to the administrative process of red-flagging potential sites of interest and value – rather than allowing the wide range of actors involved in the process, including architects, developers, planners, and local communities, to have greater responsibility in making the value judgements used to define the historic environment.

A caveat to this is that it must come with clear accountability. As the record-keeping process itself is a cumulative compilation of past and present archivists, there is often no way of determining their voices or values. Significance becomes a moveable feast and any 'Objects, places and practices that do not meet an expert-defined threshold of significance necessarily become insignificant within that conceptual framework' (Jeffrey et al. 2020, 886). This contributes to the inherently ambiguous nature of the data, and the dangers of constructing culturally meaningful data based on unspecified decision-making processes. It must be iterated that as digital resources, the contents of HERs are not neutral, inert resources, and are attached to hegemonies of power and conflict over decision making and political agendas.

Although the digitality of geovisualised databases has relied heavily on metadata, there has been little emphasis on paradata within the field. Paradata is an extension of metadata pertaining to 'issues of choice and alternative as

well as subjective decisions' (Turner 2016, 141). More apparent in virtual heritage, paradata documents processes 'of interpretation so that the aims, contexts and reliability of visualisation methods and their outcomes can be understood' (Bentkowska-Kafel, Denard, and Baker 2016, 1). Interpretive practices take place constantly within geovisualisation – what information is to be kept and what not, how to correctly ascribe metadata in situations where more than one term is applicable, and so on. Modification 'of raw and derived data to generate new derived data' (Richards-Rissetto and Landau 2019, 121) is essentially part of the job, especially in terms of formulating didactic resources. Yet the level of digital intimacy, of the kind that 'affords greater exploration and reflection on the data' (Richards-Rissetto and Landau 2019, 125) is not always fully accounted for in historic environment records. This often skirts around the question of how and why decisions are made.

It is little wonder, therefore, that it is rare that individual archaeologists are accounted for in the records, nor their gendered, ethnic, or identity-based perspectives. To some extent the typical educational and academic routes into the position are problematic in terms of the fundamentals of digitality and the wider sense of perspective. The positions are regularly advertised and categorised as archaeological positions (or at worst administrative positions), and as such the relevant qualifications often prioritise archaeological experience rather than roles in the broader heritage sector. To some extent there is evidence to suggest that predetermined routes into the historic environment sector are valuable, as implied by a rise in role-specific apprenticeships as non-integrated degree programmes offered in collaboration with Historic England (2021) for example.

Despite this, doubts remain as to whether the available funding for such roles is sufficient to be attractive, and while there are several training providers, the standardised description of duties remains fixed in the archaeological framework of stewardship. Any broader perspective would largely be at the discretion of the host institution. Cues could be taken from neighbouring disciplines (Jones et al. 2021), as despite positive steps, there remains a need to diversify the fields from which the sector selects candidates. Rather than continue the focus on *a priori* assessment of the value of archaeological resources, an offer of greater focus on collaboration and greater communication of the historic environment is required.

Finding a Public Way In

As publics, we encounter a plethora of information in our daily lives, in respect to heritage or otherwise. Finding a viable means to sift through the deluge is essential. We must be cognisant of the fact there are other interpretations of heritage, and that perhaps the only constant and compelling aspect is the need

to own a fulfilling connection to one's heritage. But in seeking to achieve the interoperability and combinability that effective digitalisation requires, further heritage related issues arise.

To be readily synthesisable in data re-use, a strict glossary of definitions is used for data retrieval, creating implications in terms of diversity, equity, and representation. For example, in being bound by terminology, diasporic groups are rendered invisible in the landscape aside from at sites such as mosques or temples, which have attained definitions within the current scope. In the understanding of the current recording process, the implication is that marginalised or minority groups are only negotiating the historic environment via their sites of worship. The process has moved from an open to a closed condition, and to paraphrase Richard Sennett (2019, 10), what has been gained in clarity has been lost in freedom. The failure to take note of other ways of knowing distances removes people from the historic environment, as well as from their own heritage via geovisualisation.

Presupposing that there is the will and the interest in doing so, there are potential solutions. While Baxter (2004) and Newman (2009) have previously indicated this to be the case, I would argue that it is only relatively recently that this has taken shape in active practice. In Scotland, for example, there is at least the possibility of public contribution and enhancement of records through MyCanmore (McKeague 2021), although the limitations of a fixed thesaurus still remain. Again it is perhaps best to return to the Know Your Place structure (see Articles I and II), inaugurated in Bristol (Insole 2017) and exported to neighbouring counties, most recently in Worcester (Worcester City Historic Environment Record 2021) on the back of National Lottery Heritage funding. The incorporation of the disenfranchised into interpretations of heritage presents not only a more balance picture of the historic environment but also provides a more democratically representative means of participating. Inclusion in one's own heritage provides a sense of belonging which facilitates understanding and even cooperation among diverse groups who may view heritage in very different terms, fostering a more dynamic and mobile heritage space.

Modelling Representativity

Richard Sennett (1996; 2019) often writes of a medieval Hanse adage that '*Stadt Luft macht frei*', or 'the city air makes you free'. In fact, these words were often inscribed over the gates of Hanseatic towns (1996, 155). On the surface, this may seem to be representative of a general philosophical tradition, but even throughout the Hanseatic League, it could barely be said to be representative. For example, despite Hanseatic interests in Stockholm and Visby, '*Stadt Luft macht frei*' likely meant little for the rights of Jewish communities, who were not given the right to settle until 1718 (Adams 2020, 21), long after the Hanse began

to dwindle. The right to do business, contracted as an equal, seldom equated to freedom for medieval Jews. As such, the example of Judaism is generally a prime example of the historical failures of representativity and how not to repeat them in the present.

Tying Sennett's writing and modelling to the trials and tribulations of Jews in urban historic environments is the city of Venice. Here Venetians built a ghetto in the sixteenth century, allowing Jews to leave at dawn, obliging them to return at dusk, when the gates would be locked and law enforcement would control the border (1996, 155). This would later become reflected in the Visualising Venice project. While it is primarily known as a training environment to engage young scholars in digital technologies, in focusing on different types of interconnected experiments in mapping and 3D modelling, considerable attention is devoted to the Venetian Ghetto (Calabi et al. 2014; Bruzelius 2020, 69). Utilising AR technology to map sites of relevance to Judaism throughout the city, the approach aims to re-enfranchise Jewish voices within the historic environment and the relation of this hostile environment to that of a wider geographical area. Similar AR approaches can be found in the place-based historical game Jewish *Time Jump: New York*, which was overtly designed to challenge the null curriculum of what is left out of mainstream schooling (Gottlieb 2017). Given that anti-Semitism is an enduring historical theme, it is little surprise that technology is leveraged as an agent of change.

The awareness of critically and reflexively minded projects such as the above tends to illuminate the opportunities that have been missed to achieve similar effects. This partially inspired the inclusion of Article III, which in addressing the livelihoods of the population of Gothenburg in the first 100 years of its existence draws specific references to intersocietal conflicts in the city. Here the sentiments of the city are represented by slurs daubed as part of the design of the exhibition scenery representing the city walls. By comparison, the digital surrogate of Gothenburg is yet to present more of what it was to be in the city in 1698. This is emblematic of the issues involved in reproducing the historic environment without the societal aspect: the *cité* is totally divorced from the *ville* (Sennett 2019, 63).

How then does one reintroduce that aspect, representing more than simply the material body of the historic environment? As well as the suggestions offered in Article IV, I am minded to include ideas inspired by Haidy Geismar's input to the CHEurope project programme (CHEurope 2018). In offering her feedback to the topic of my thesis, potential avenues for exploring methods of lending digital space to disenfranchised voices were discussed. Given the nature of the Gothenburg model, the focus turned to its historic city walls. Generally speaking, such architectures form liminal spaces, often bordering areas of difficult socio-economic circumstances, wherein diverse and diasporic communities tend to gather (Schofield et al. 2018, 5). Although Article

IV highlights the living situation in areas close to martial elements such as powder storage, the liminal status is not evident in the same way for contemporary Gothenburg, on the premise that for the most part, the fortifications have been removed. This is not to say this is not problematic. The *espace* which the fortifications demarcated still functions as the social, political, and economic centre of the city, and is largely insulated from the broader social conditions of the city, particularly north of the *Göta* river.

What little above-ground material remains of the fortifications, although recently renovated, is regularly the target of graffiti. In response, Geismar ventured that digitality may offer a platform to explore these dynamics. Rather than the remaining bastion, utilising a digital surrogate of the city walls as a canvas for virtual graffiti and street art for the voices of diversity in Gothenburg could be a means of allying creative viewpoints as a form of serious play (Galloway 2004; Woolford and Dunn 2013; Whitehead 2017). Forming a living collection, rather than an interpretation of the city provided from the top down, such approaches might lend agency to heritage actors who may not even be aware they are heritage actors themselves. This in essence draws on the issues of institutional power and spheres of normative activity.

The question of how one communicates the availability of such resources to disenfranchised communities is more of an issue. In Gothenburg at least, it is very much a feasibility that a number of newly arrived denizens may have never heard of the concept of a museum, let alone plan to visit one. This is doubly problematic when one considers that a great many virtual heritage models 'are seldom seen outside of conference presentations, one-off museum exhibitions, or digital reconstructions used in films and television programs' (Champion and Rahaman 2019). This is far from sustainable on a public outreach level. On these grounds it is hard to fully support Ch'ng, Gaffney and Chapman's earlier arguments for democratisation. On the contrary, I find it easier to support the opposite. Taylor and Gibson (2016, 417) argue precisely this, that although there are examples of how digitality has enabled consumption of heritage in new ways on new terms, the role of democratisation of heritage is not yet fully understood.

Authenticating Space in the Historic Environment

To complement the theme of authenticity presented throughout the thesis, this section focuses on the various ways in which authentication is defined and sought in varying degrees throughout digital expressions of historic environments. This is a discussion that goes beyond tedious quarrels over the semantics of committing to source material. Nor will it simply deny the possibility for authentication based on the rupture and discontinuity between the material medium and context of the space, or object and the material

medium and context of its digital surrogate (Benjamin 2015). Culturally, heritage authenticity is as much a question of doctrine as the networks of transmission, the material bases of inscription and the etymologies of words (Debray 2000, 2).

Article II touches upon the subject in several respects. With regard to geovisualisation, the article utilises Latour and Woolgar's perspective (1986) on the perception of fact in the digital expression of historic environment records and how this perception is fuelled by the repeated enrolment of these archives in gazetteers for the benefit of the system that establishes authority. Yet it also establishes the spectrum of authenticity, moving between Latour and Lowe's (2011) hybrid application of technology in art history to authenticity as a product of community heritage and participation (Jones et al. 2017), challenging the presupposition that authenticity is both internal and intrinsic.

The desire to recreate recalls Jorge Luis Borges's account of the fictional Pierre Menard in the short story entitled *Pierre Menard, Author of the Quixote*. Menard, as his critics understood it, intended to copy or recreate Cervantes' Don Quixote but, as Borges testifies, Menard's purpose was to compose it anew:

> His admirable ambition was to produce a number of pages which coincided – word for word and line for line – with those of Miguel de Cervantes (Borges 1999b).

Menard's perspective on history functions not so much as the 'delving into reality but as the very fount of reality' – idealising what we believe happened (Borges 1999b, 94). Thus, I would challenge the use of the term 'reconstruction' in the context of virtual heritage, based on the failure to recapture the original processes of creation (Papadopoulos 2018). As a term, 'reconstruction' takes on a specific meaning in archaeology with the advent of computer applications. Not only does this semantically differ from the idea of returning something to its original state within the parameters of the original materials and workmanship, it also requires distinct levels of transparency in order for the viewer to negotiate the biases and perceptions of the creators – especially so when combined with high-fidelity graphic realism (Papadopoulos 2018).

Article IV articulates that authenticity should not be sought via the attempt to produce 'mimetic fidelity' (Shanks and Webmoor 2013, 138). Perpetuating meaning requires the dual mission of archiving and pedagogical focus (Debray 2000, 11), rather than relying on semiotics and iconography. To this end I have utilised the term digital surrogate, reflecting 'an underlying assumption that a digital reproduction ought to be able to stand in for the real thing' (Rabinowitz 2015, 29). To this I add that I consider the idea that a digital surrogate has to be a faithful copy to be misleading. Rabinowitz (2015, 29) indicates that a good

surrogate 'is supposed to provide, in some sense, access to the original, now made ubiquitous and opened for inspection on a level of detail that the original itself might not allow.' As things, digital surrogates are not just representational, they 'more than resemble, they take the places of the original situation' (Latour 1999, 67).

This is occasionally understood through the dynamic of time travel (Holtorf 2017) wherein an invariably heavily mediated sense of expediency or immediacy may present a historic environment in a manner the original cannot. The archival undertaking of digitisation, creating digital surrogates to stand in for the analogue record, is a further demonstration of the authentication that digitality engenders. The retention of imperfections supports the notion of re-production, leaving traces of the production process as anomalies or errors in the archival process (Conway 2014, 58) – which is itself an authentic form of material production. Thus, as a phenomenon, authenticity must be looked upon from several perspectives. The following sections of the thesis will build on this and attempt to elucidate the phenomena more broadly than just faithfulness to the source material or photorealistic facsimile.

Historic Environments and Technologies of the Self

To protect our understanding of reality and experience, we regularly draw lines between what we distinguish as 'virtual and actual, or virtual and real, digital and analogue, or metaverse and physically based reality' (Huvila 2013, 193). We are accustomed to the idea of the virtual, digital, or the metaverse in a heritage context as being a means to '(re)make the past for the present (us) or to take us to the past – to attempt to organise the past for us to understand, or to make us to understand the arrangements of the past' (Huvila 2017, 84). Despite this, we must not take the use of digitality, whether as a virtual construction or as geovisualisation, to guarantee a connection between information-sharing and communication. To clarify, Sennett (2013, 28) suggests that 'information-sharing is an exercise in definition and precision, whereas communication is as much about what is left unsaid as said; communication mines the realm of suggestion and connotation'. We may choose to add a third, diachronic dimension in 'transmission'. If communication is instantaneous between contemporaries, then transmission takes its course 'through time …, developing and changing as it goes' (Debray 2000, 3). The issue, however, is that this disconnect is shown to affect institutional practices of cooperation (Sennett 2013, 28), which in the context of this thesis is an aid to the promulgation of authorised heritage.

More than just a method of participation, the approaches implemented by the likes of Know Your Place also represent cooperation between public and institution, not as a form of collecting information, but as a means of transmitting self-determined and culturally meaningful heritage. Cooperation

in this sense elicits the irreducible nature of the relationship between the speaking subject and the grammatical subject, or the enunciator and the enunciated, as a form of truth (Foucault and Pearson 2001, 12–13). In the hegemony of knowledge and power, digitality has the potential to form the bridge between authorised discourse and what Foucault (1988) determines to be 'technologies of the self':

> which permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform I themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality.

Technologies of the self in this fashion connect digitality to the realm of heritage and well-being as an exploration of personhood and public engagement – going beyond the individualistic horizon of communication as a means of transmitting lasting meaning (Debray 2000, 4). This is reminiscent of Sven Lindkvist's (1978) '*Gräv där du står*' (Dig where you stand) principle. This linked 'use of archaeology and other historical methods to understand the history of where communities stood but also … emphasised the significance of history, the importance of people participating in the telling of their own histories' (Flinn and Sexton 2013, 7).

While it would be uncritical to overestimate the power allocated to sectors where they themselves are subject to fluctuations in budgets and relevance, technologies of the self question the regular paradigm of power and control in historic environments, particularly those perpetuated by the traditional management of HERs. What is evident, however, is that there are differing processes of valorising aspects of the historic environment. Archaeological sites can have value based on the reputation and workmanship of the excavator as much as their material inventory (Yarrow 2006, 26). Alternatively, new findings can have little impact whatsoever upon the community-derived meaning of monuments in the historic environment (Papmehl-Dufay 2020, 69). Technologies of the self thus offer a means of authenticating the historic environment. This has proved to be particularly viable in historic environments contextualised in post-industrial urban neighbourhoods, where technologies of the self form a technique of legitimacy, establishing discourse between stakeholders, community, and space as a method of securitisation and historicising of space (Foultier 2020; Zuljevic and Huybrechts 2021).

Creativity as Authenticity

The concepts of facts and fetishes, and indeed the neologism 'factish', are another facet of Latour's somewhat idiosyncratic lexicon (2010). But the crux of what he seeks to define through these terminologies holds value in the

examination of digitality in the historic environment. From his perspective, iconoclasm is the end result of representation, as representations are a social construct; 'The more the human hand can be seen as having worked on an image, the weaker is the image's claims to offer truth' (Latour 2002, 16). In theorising virtual heritage, it is tempting to agree with Helen Wickstead's analysis that 'the false images must be smashed in favour of approaches closer to the "real" world – to the actual embodied experience of past people' (2009, 254). This is touched upon by Article IV, addressing the uncritical usage of maps to formulate the basis of archaeo-historical constructions. Mike Duggan (2017, 4) states that 'Media and communications research has largely focused its attention on the ways that digital technologies have come to augment and transform traditional media practices' such as the cartography used as source material for the *Göteborg 1698* model. However, rather than representing a replicable reality, the digital surrogate produced is not one of the city, but a translation of the archive. Remembering that, at least in the Early Modern period, plans such as these represented philosophical ideals or pretences of military rationalisation, then we are not truly seeing a representation of the *ville*, let alone the *cité*. Despite this, based on the contradictory nature of the historic environment and of authenticity itself, this does not necessarily rule out legitimacy in any form.

In their critique of the political economy of virtual media in archaeology, Shanks and Webmoor (2013, 179) highlight that, while virtual heritage may rely on mimesis and fidelity to a degree, the wider perspective should be underpinned by the 'political matter of re-presentation – that is, advocacy and witnessing, who is representing … the past, for whom, and on what basis'. By extension, it is not a case of drawing 'a firm line between storytelling (false) and history (true)' as a cynical means of determining what to accept or reject (Lowenthal 1998, 118). This is reflected in Article IV's discussion of the architectural discrepancies in *Göteborg 1698* and the Assassin's Creed franchise, for example. Here I utilised Westin and Hedlund's (2016) term 'polychronia', coined as means to account for the chronologically mismatch between the Rome of the historical fact and the Rome of the video game. While it may be self-evident that the video game industry presented here is biased towards entertainment, achieving a common understanding through hyper-realistic virtual worlds creates a parallel narratology for digital natives. This is effectively what Piotr Kuroczyński describes as a virtual fictitious authenticity (2020, 85). The efficacy of such digital surrogates is partially the reason that transparency is one of the primary tenets of the London Charter (Denard 2012; Hermon and Niccolucci 2018).

Key to this is the process of inscription, which, whether in analogue or digital medium, supports all kinds of stories existing along 'a spectrum from intense, univocal narrative to weak, ambiguous ones' (Engberg and Bolter 2015, 184). The narratology of inscription has lent itself well to digital applications, where the line between fact and fiction has deliberately been blurred as a

method of remediating historic events, and as a means of prompting new possibilities for activism and civic engagement. One such example is the Turmoil Alley/Lärmgrand mixed media project (Engberg and Linde 2018). Here, fictive amalgamations of real events and people are presented as a cogent, but fictional narrative through an AR-ready app, 'mirroring life in Malmö during years of social, political and cultural changes in Sweden' (Engberg and Linde 2018, 118). While the cynic may insist that this is simply conceived out of falsehood, the larger facts of history were largely kept intact, utilising the fable aspect as an organisational metaphor. Furthermore, it draws on archival information to populate the biographies of the characters – named for existing historical people (Engberg and Linde 2018, 120–121). Rather than aiming to reproduce impossible absolute truths, plausibility opens the door to participation as a means of digitally tackling issues like decoloniality, migrant heritage, and urban politics.

Heritagisation itself is a process of creation and construction, as is the performance of its marketing. There is a facet of neoliberal governmentality and its response to heritages, whether of a local or national nature, that provoke a market ideology to valuation. This occurs through the cultivation of 'collective attachments to cultural goods' and the identification of 'communities as subjects by diverse legal instruments, transnational agencies, corporate attentions, and global policy norms that focus on local cultural assets as significant goods and capacities' (Coombe 2015, 373). This leads to aspects of heritage, particularly polished and marketable aspects of the past, being packaged and commodified, thus contributing 'to the shaping of high amenity environments and place images and brands, promoted in internal or external markets in support of economic goals that are not directly concerned with the past' (Ashworth 2014, 6).

Often this is concerned with concepts of place, for example the utility of the *Göteborg 1698* model beyond the confines of the museum (Article IV). But, like the historic environment, place itself is constructed out of the anthropological attachment an understanding of social space and all its connections and networks (Lefebvre 1991). Coupling social forces to space in a heritage context led to the going of the term 'first-places', 'broadly defined as the location from where purportedly a social identity is taken as having emerged by those who see themselves as related to it' (Mota Santos 2017, 121). These are places strongly engaged with the 'politics and poetics of affect and emotion' as 'as performatively imagined places assume a highly central position in the symbolic construction of a collective-self' (Mota Santos 2017, 124).

Conceptually, this need not be applied to the chronologically first place in the timeline of settlement. Gothenburg can be used as an example. It was not the first location for the city, with precursors at *Älvsborgsstaden* and *Färjenäs*, as

well as *Lödöse* and *Nya Lödöse* (Andersson, Bramstång, and Nilsson Schönberg 2003, 23). Nor, despite various attempts to inscribe greater local meaning through appropriation of prehistoric stone carvings from further up the coast (see the University of Gothenburg insignia), did the human presence from any preceding historic phases come to be retained within the city's identity and public consciousness with any great significance. However, as explored through both Articles III and IV, the Early Modern period of the city, prior to its pre- and post-industrial expansion, finds itself at the focal point of the fourth centenary celebration. This is no coincidence, given that it has frequently been revisited within the city's cultural conscience despite the heterogeneity and multivocality of the present-day population. As a creative and performative process, the authenticity of this exogenic identity relies on repeated revisitation and exegesis. The enactment of creating 'spaces that are persistently negotiated and re-negotiated through public debate, historiographically constructed pasts and the multiple and conflicting stories of the present' (Engberg and Linde 2018, 120) is already a fundamental process in heritagisation. There is not an innate, self-perpetuating origin myth resisting heritage dissonance. A ramification of this is the implication that the social construction is therefore present as a facet of authenticity throughout the heritage creation process.

Maps and Multivocality in the Historic Environment

Deep mapping is the essence of geovisualisation, allowing the augmentation of contemporary perspectives of the landscape with layers of past occupation, whether near or distant. As I have argued above, this can form a stable and authentic means of accessing heritage. The key to this is providing communities with the digital space, for example Know Your Place, or the digital tools to support this. While the search for fully democratised digitality of heritage is ongoing, Ch'ng, Gaffney, and Chapman (2013, 358) were correct in indicating that the accessibility of freely available software does impact on the means through which heritage can be accessed and created. GIS software, for example the likes of the open source QGIS (2021), directly translates to content creation, with studies identifying that untrained staff, volunteers and members of the public can benefit from the technology with basic training (Kokalj et al. 2013; Nourse, Insole, and Warren 2017).

If this is to be successful, there are requirements for critical practice and reflection. For example, there is a necessity for transparency and ethically sound practice. Particularly so when participating with indigenous epistemologies, where 'traditional, sometimes highly sophisticated, spatial information mapping practices were interrupted and buried by the domination of economic and social hegemony which included the science and culture of the invaders' (Alvarez Larrain and McCall 2018). While this form of mapping proposes to make visible the historic environments rendered invisible by colonialism, it must be undertaken autocratically and reflexively to avoid the

continuation of colonial paradigms through western epistemological assimilation. Maps are as much a facet of power as museums in this dynamic.

Colonial landscapes may seem far and distant from the perspective of the average HER user, however. Closer to home, contested spaces of heritage are taking on more forms. This includes 'a growing number of places comprising seemingly "ordinary" architectural fabric and unremarkable histories – places such as local pubs, public housing, streetscapes, public spaces, and community facilities' (Cooke and Buckley 2021, 143). Such places rarely meet the criteria for listed building or scheduled monument status. Participatory GIS (PGIS) can operate as a means of mapping the spatial-emotional relationship in the historic environment (Yang Wang 2021), including the potential to include chorographic and physical engagement with space as defined by personal experience and movement – though not necessarily with the same potential for lasting cultural transmission (Dunn 2019, 136).

From a critical heritage perspective, there remain points to be wary of. While it is acknowledged that 'expert citizens' from civic groups or those who claim to represent the wider public may only represent a narrow demographic (Yang Wang 2021, 160), these disparities should not be lightly brushed off. Hewitt and Pendlebury indicate that the presence of existing local amenity groups is 'no bar to the formation of others' (2013, 37), but that does not necessarily equate to the same level of agency or authority. Where 'expert citizens' or local groups 'add to, or fill a deficiency in, the capacity of the local state' they often utilise a network of middle-class professionals (Hewitt and Pendlebury 2013; Yang Wang 2021). While certain groups assert their authority on this basis, other groups are seen to self-represent as direct opposites, positioning themselves as moral authorities.

With this blurring of lines, it is not clear how genuinely disenfranchised and diverse voices are given room to contribute. It makes little sense, in terms of reversing dynamics, to replace one middle-class, educated, customarily white voice, with a similar voice from outside of the institution or profession. On this basis we should not see mapping as an outcome but a trajectory. Nor should we underestimate the role of maps in reproducing the politics of 'monochromatic identity', particularly given their propensity for acting as obstacles to 'imagining and positively experiencing cultural diversity and migration' (Rossetto and Lo Presti 2021, 2).

Thus, while Rossetto and Lo Presti call for 'an enlarged (conceptual, empirical, and creative)' form of nationhood, the very concept of the national is considered an opposition to counter-mapping projects (Duggan 2021, 3). Although counter-mapping has value, as does pushing for a more than representational form of mapping projects, including geovisualisation, we must

not forget that these practices are 'intrinsically tied to cultural practices and land, which researchers are not always free to roam and exploit' (Duggan 2021, 4). Denis Byrne, like Mike Duggan (2021), offers caveats. Not only does counter-mapping increase the volume of Indigenous knowledge in the public domain, infringing on the cognitive sense of ownership, but it also privileges spatial knowledge over storytelling, for example. Furthermore, as a facet of digitality, it 'can be reproduced at will and consumed without reference to the original knowledgeholder' (Byrne 2008, 257). If authenticity is produced by cooperative and community self-identification and representation, then it is they who ought to be the primary beneficiaries of the products.

Bodily Practice and Spatial Immersion

The history and prehistory of anatomically modern humans, *Homo sapiens,* has been marked by a commitment to innovate material culture (the evidence for the same being said for *Homo neanderthalensis* is scarce but abstract evidence exists (Bello 2021). Régis Debray (1996) divides this period into three 'mediaspheres' which characterise the trajectory of human cultural transmission:

1. the 'logosphere', or the era of idols
2. the 'graphosphere', or the era of art
3. the 'videosphere', or the era of the photographic and moving image.

To this, Vandenberghe (2016, 38) indicates that Debray has noted we have entered a new era of the digital 'hypersphere'. Debray defines each of these eras as 'an environment of life and thought with strong internal connections, an ecosystem of vision and thus a certain horizon of visual expectation' (Debray and Rauth 1995, 532). The implication of visual expectation recalls criticisms of virtual and digital heritage that implies that the ocular centric elements are too prevalent, especially in pedagogical terms. As Pujol Tost and Economou (2009, 161) argue, 'learning or understanding will only be achieved if the physical and virtual interfaces are multisensorial and intuitive enough', heavily impacting potential authenticity. Evaluative research indicates that, in certain contexts, visitors to virtual heritage installations still prefer human guides to interfaces; the ability to interact, or were confused by 'a minimum of navigation cues or far too much overlapping of textual and spatial information' (Economou and Pujol Tost 2007; Champion 2013). The resultant implication is that authenticity is unlikely to be achieved through visualisation alone.

Per Stenborg notes that traditionally museum exhibitions are experienced through vision and hearing, rather than touch or bodily movement (2017, 80). Despite its digital presence, *Göteborgs Födelse* (Article III) is no different. But this is a changing landscape. Previously to experience embodied museum interaction, such as reproducing ancient practices like flint knapping, one might visit heritagescapes such as an open-air museum. Visits to places like

Butser Ancient Farm, *Skansen*, or *Ekehagens Forntidsby* (Ekehagen Prehistoric Village), where the educational interaction with a historic environment (Westergren 2006) is the focus, are often framed as 'time travel', via experimental archaeology or enactment. However, this too is increasingly subject to a digital trajectory. A research group at St Hilda's College at the University of Oxford in collaboration with Umeå's HumlabX have undertaken research sensory research in producing a virtual reality representation of Roman pantomime, where dance students perform through avatars placed in a virtual reality model of the Theatre of Pompey in HTC Vive (Foka et al. 2018, 272).

While the projects above took place in a research setting, other attempts to involve bodily practice are centred in more participatory circumstance. Termed 'virtual reality arts play' (Ljungar-Chapelon 2017), at the *Kivik* Bronze Age burial chamber in Skåne, Sweden, museum visitors and users can interact with an installation via body gestures, taking on the role of prehistoric rock art figures as a means of interpreting a procession carved in the stones of the grave. Not only does this project utilise creativity in attempting to fill gaps in the evidence, it also offers the potential to spatialise differences in the varying bodies of users as a dissection of corpo-reality, and exploring the space of Irigaray's thinking (1993). Immersive 'architectures' such as these encapsulate the embodiment of human motion in an assemblage of real and digital space aiding the contextualisation of 'multisensory mediation between humans, machine agents and virtual environments' (Kenderdine and Shaw 2014).



The Bronze Age stone carvings illustrated the procession in the Kivik grave

(photographer: Maud Illsley 2015)

The relationship between users and their presence is key in virtual heritage paradigms. This is prominently in regard to the development of hermeneutic richness, which is attained through the internal 'depth and vividness of a medium that allows for interpretation of different cultural and social perspectives as judged from an emic or etic viewpoint' (Champion 2009, 41). A discussion on the relevance of presence is a focal aspect of the evaluation in Article IV. However, presence in geovisualisation is more difficult to attain. As I argue in Article II, the means through which space is inhabited by the hybrid contents of the database rather than anthropological actants restricts dwelling. It is therefore reminiscent of the non-place coined by Marc Augé, where users are bereft of the experience of time and continuity (2008, 20). However, Lawrence Shaw and Keith Challis's (2013) reading and application of Edward Soja's thirdspace enquiry into the spatial turn offers an interesting potential for embodied geovisualisation.

According to Soja's enquiry, the first space 'is focused on the "real" material world' and the second space, 'a reality through "imagined" representations of spatiality' (geovisualisation) (Soja 1996, 6) whichh created a 'recombinatorial and radically open perspective' as a thirdspace – previously inaccessible in experiencing the two other modes separately. Bringing archaeological identifiers, as elements of the historic environment, into a geovisualised application offers, in a very literal sense, a mobile immutable. If the user is able to articulate digitised site data with physical space and being at the same time, social space can be actualised in a performative sense. The aforementioned Fornfynd app operates in this manner, though as a national resource it perhaps suffers from a lack of localism. Articulating this in the English context, the next step for HERs would be to follow this precedent and expand their means of digital accessibility.

To reflect on the importance of bodily practice, I turn once again to André Leroi-Gourhan. In 'Gesture and Speech', he argues that 'humanisation begins with the feet' (1993, 149) – biomechanically liberating the hand and providing the locomotion for the exploration and taming of space. De Certeau's (2011) reading of *map* and *tour* has similar connotations, in that we may recognise a digital surrogate of a historic environment as place but only through movement might we actualise the space. In discussing the *chaîne opératoire* of the democratisation of urban space, he determines that the networks of gestures and narratives are particularly important. Gestures, in his ideology, 'are the true archives of the city, if one understands by "archives" the past that is selected and reused according to present custom' (De Certeau 1998, 141). In

this mode, bodily practice, a key to the means through which societies remember (Connerton 1989), is a necessity, especially in urban contexts, as it is this which 'remakes the urban landscape everyday … and that structure the experience of the city' (De Certeau 1998, 141).

Final Thoughts

The components of place are considerably varied, but in terms of cultural memory and past human activity, the historic environment has a distinct and substantive role as a defining factor. The importance of perception and image is equally significant in forming 'encounters with the city (or any other geographical entity) … and all actions happening within the city, or everything a city does, communicate messages about the city's image, also amongst local residents' (Fredholm and Olsson, 2017, 141). Increasingly as the historic environment is commodified as a facet of heritage, in education, museology, tourism, and video games, the concept of place and historic environment is becoming amalgamated. But in the frequent delimitation of the historic environment as a representation of the cultural landscape, or as a palimpsest of the built environment, or even merely as an attribute of archaeology, the vitality and vibrancy of what a historic environment effectuates is diminished. Reading the historic environment and the processes through which digitality advances our encounters with it through its entanglements in actor networks, spaces, and assemblages is means of problematising practices that have either been under-theorised or unacknowledged.

To end as I began, I will return to Paul Klee. In his image *Angelus Novus*, Klee presents the figure of a divine being, blown forwards by change, looking towards the past (Sennett 2019, 119). Walter Benjamin (2015) saw this as a metaphor for communism, where progress was sought, the angel saw only a single chain of catastrophic events – breaking the continuity of the past and present in a similar vein to Latour's Moderns (1993). Instead of simply replacing communism with for globalism or neoliberalism and the commodification of digitalised heritage for commercial and individual gain, we must create the angel anew: a totem of digitality, marking the continuous line of epistemological growth along which we encapsulate the past as a product of the present.



Paul Klee, *Angelus Novus* (1920) Oil transfer and watercolour on paper

Photo © The Israel Museum Jerusalem by Elie Posner

References

Adams, Jonathan. 2020. ""Untilled Field" or "Barren Terrain"? Researching the Portrayal of Jews in Medieval Denmark and Sweden." In *Antisemitism in the North*, edited by Jonathan Adams and Cordelia Heß, 21–40. Berlin: De Gruyter.

ALGAO/English Heritage SMR Working Party. 2002. *Historic Environment Records: Benchmarks for Good Practice*. London.

Almevik, Gunnar, and Jonathan Westin. 2020. "Entering Hemse: Enacting the assemblage of a 12th-century Gotlandic stave church." In *Agency, Micro-History and Built Environment: Buildings in Society International BISI III, Stockholm 2017*, edited by Göran Tagesson, Per Cornell, Mark Gardiner, Liz Thomas, and Katherine Weikert, 13–28. Oxford: Archaeopress.

Álvarez Larrain, Alina, and Michael K. McCall. 2018. "Participatory Mapping and Participatory GIS for Historical and Archaeological Landscape Studies: A Critical Review." *Journal of Archaeological Method and Theory*. doi: 10.1007/s10816-018-9385-z.

Ancona, Massimo, Davide Conte, Donatella Pian, Sonia Pini, Gianluca Quercini, and Antonella Traverso. 2008. "Wireless networks in archaeology and Cultural Heritage." In *ARCHAIA: Case Studies on Research Planning, Characterisation, Conservation and Management of Archaeological Sites*, edited by Nicolò Marchetti and Ingolf Thuesen. Oxford: BAR Publishing.

Anderson, Ben, and Colin McFarlane. 2011. "Assemblage and geography." *Area* 43 (2):124–127. doi: 10.1111/j.1475-4762.2011.01004.x.

Andersson, Tomas, Carina Bramstång, and Göte Nilsson Schönberg. 2003. *Pålad stad: Berättelser om Göteborg från början till nu*. Stockholm: Riksantikvarieämbetets förl.

Andrews, Gill, Stuart Brookes, Duncan Brown, Stewart Bryant, Paul Drury, Stephen Dunmore, Christopher Evans, Gillian Hey, John Hines, Rob Lennox, John Lewis, Hana Morel, and Christopher Scull. 2020. *The Future of Archaeology in England: A Manifesto*. London: Society of Antiquaries of England.

Arping, Åsa. 2019. "Replik: Killgissa inte om humaniorans kris." *Göteborgs Posten*. https://www.gp.se/kultur/kultur/replik-killgissa-inte-om-humaniorans-kris-1.19185385.

Ashworth, Gregory J. 2014. "Heritage and Economic Development: Selling the Unsellable." *Heritage & Society* 7 (1):3–17. doi: 10.1179/2159032x14z.00000000015.

Ashworth, Gregory. J., Brian J. Graham, and John E. Tunbridge. 2007. *Pluralising Pasts: Heritage, Identity and Place in Multicultural Societies*. London: Pluto Press.

Assmann, Jan. 2015. "Tradition, Writing and Canonisation: Structural Changes of Cultural Memory." In *The Formative Past and the Formation of the Future: Collective Remembering and Identity Formation*, edited by Terje Stordalen and Saphinaz-Amal Naguib. Oslo: Novus Press.

Atkinson, David. 2007. "Kitsch Geographies and the Everyday Spaces of Social Memory." *Environment and Planning A: Economy and Space* 39 (3):521–540. doi: 10.1068/a3866.

Augé, Marc. 2008. *Non-places: An introduction to Supermodernity*. London: New York: Verso. Original edition, 1995.

Bachelard, Gaston. 2004. *The Poetics of Space*. New York: Penguin. Original edition, 1958.

Baker, David B. 1977. "Survey and the Historic Environment." In *Planning and the Historic Environment II*, edited by T. Rowley and M. Breakall, 1–23. Oxford: Oxford University Department for External Studies.

Baker, David B. 1983. *Living With The Past: The Historic Environment*. Bedford: David Baker.

Barratt, Robert P. 2021. "Speculating the Past: 3D Reconstruction in Archaeology." In *Virtual Heritage: A Guide*, edited by Erik Champion, 13–24. London: Ubiquity Press.

Barrett, John C. 2014. "The material constitution of humanness." *Archaeological Dialogues* 21 (1):65–74. doi: 10.1017/s1380203814000105.

Baudrillard, Jean. 1983. *Simulacra and Simulation*. Translated by Sheila Faria Glaser. Ann Arbor: University of Michigan Press.

Baxter, Ian. 2004. "From Heritage to Historic Environments: Professionalising the Experience

of the Past for Visitors." *Journal of Hospitality & Tourism* 2 (2):1–14.
Baxter, Ian. 2010. "Global Heritage Tourism: The value of experiencing the past." In *Heritage Values in Contemporary Society*, edited by George S. Smith, Phyllis Mauch Messenger and Hilary A. Soderland. Walnut Creek: Left Coast Press.
Bean, Bill. 2019. "Bringing values along as tech marches forward." Communitech, accessed 27th December. https://www.communitech.ca/technews/bringing-values-along-as-tech-marches-forward.html.
Belford, Paul. 2020. "Ensuring Archaeology in the Planning System Delivers Public Benefit." *Public Archaeology*:1–26. doi: 10.1080/14655187.2020.1833525.
Bello, Silvia M. 2021. "Boning up on Neanderthal art." *Nat Ecol Evol*. doi: 10.1038/s41559-021-01506-z.
Benjamin, Walter. 2015a. "Theses on the Philosophy of History." In *Illuminations*. London: Bodley Head. Original edition, 1968.
Benjamin, Walter. 2015b. "The Work of Art in the Age of Mechanical Reproduction." In *Illuminations*, 211–244. London: Bodley Head. Original edition, 1968.
Bentkowska-Kafel, Anna, Hugh Denard, and Drew Baker. 2016. "Introduction." In *Paradata and Transparency in Virtual Heritage*, edited by Anna Bentkowska-Kafel, Hugh Denard and Drew Baker, 1–4. Farnham: Ashgate.
Berry, David M., and Anders Fagerjord. 2017. *Digital Humanities: Knowledge and Critique in a Digital Age*. Cambridge, UK: Polity. Book.
Bodenhamer, David J., John Corrigan, and Trevor M. Harris. 2015. *Deep Maps and Spatial Narratives*. Bloomington & Indianapolis: Indiana University Press.
Bonacchi, Chiara. 2014. "Understanding the public experience of archaeology in the UK and Italy: A call for a 'sociological movement' in Public Archaeology." *European Journal of Post-Classical Archaeologies* 4.
Bonacchi, Chiara. 2021. "Heritage transformations." *Big Data & Society* 8 (2). doi: 10.1177/20539517211034302.
Bonacchi, Chiara, and Marta Krzyzanska. 2019. "Digital heritage research re-theorised: ontologies and epistemologies in a world of big data." *International Journal of Heritage Studies* 25 (12):1235–1247. doi: 10.1080/13527258.2019.1578989.
Borges, Jorge Luis. 1999a. "On Exactitude in Science." In *Collected Fictions*, edited by Jorge Luis Borges and Andrew Hurley, 325. London: Penguin Books. Original edition, 1960.
Borges, Jorge Luis. 1999b. "Pierre Menard, author of the Quixote." In *Collected Fictions*, edited by Jorge Luis Borges and Andrew Hurley, 88–95. London: Penguin Books. Original edition, 1944.
Brück, Joanna. 2005. "Experiencing the past? The development of a phenomenological archaeology in British prehistory." *Archaeological Dialogues* 12 (1):45–72. doi: 10.1017/s1380203805001583.
Bruzelius, Caroline. 2020. "The Digital Revolution and Modeling Time and Change in Historic Buildings and Cities." In *Digital Cities*, edited by Maurizio Forte and Helena Murteira, 62–71. Oxford: Oxford University Press.
Bugalski, Łukasz, and Maria Pia Guermandi, eds. 2019. *Heritage explorations across Europe: CHEurope, interdisciplinary training network in critical heritage studies*. Vol. 4, *Dossier IBC*. Bologna: Istituto per i beni artistici culturali e naturali della Regione Emilia-Romagna.
Byrne, Denis. 2008. "Countermapping: New South Wales and Southeast Asia." *Transforming Cultures eJournal* 3 (1):256–264.
Calabi, Donatella, Elisa Bastianello, Valentina Buttolo, Fabio D'Agnano, Isabella Di Lenardo, Ludovica Galeazzo, Gianmario Guidarelli, Martina Massaro, and Paolo Vernier. 2014. "The 500th Anniversary of the Venice Ghetto." Visualizing Venice, accessed 18th July. http://www.visualizingvenice.org/visu/?p=249.
Callon, Michel. 1986. "Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay." In *Power, Action and Belief: A New Sociology of Knowledge?*, edited by John Law. London; Boston; Henley: Routledge & Kegan Paul.
Cameron, Fiona, and Sarah Kenderdine. 2007. *Theorizing Digital Cultural Heritage: A Critical*

Discourse. Cambridge, Massachusetts: The MIT Press.
Campagnol, Gabriela, Stephen Caffey, Mark J. Clayton, Kevin Glowacki, Nancy Klein, Julian Kang, and Geoffrey Booth. 2020. "Unreal Projects." In *Digital Cities*, edited by Maurizio Forte and Helena Murteira, 279–298. Oxford: Oxford University Press.
Campanaro, Danilo Marco, Giacomo Landeschi, Nicoló Dell'Unto, and Anne-Marie Leander Touati. 2016. "3D GIS for cultural heritage restoration: A 'white box' workflow." *Journal of Cultural Heritage* 18:321–332. doi: 10.1016/j.culher.2015.09.006.
Carman, John. 2015. *Archaeological Resource Management: An International Perspective*. New York: Cambridge University Press.
Carpentier, Nico. 2021. "The European Assemblage: A Discursive Material Analysis of European Identity, Europeanity and Europeanisation." *Filosofija Sociologija* 32 (3):231–239.
Carter, Daniel. 2018. "Reimagining the Big Data assemblage." *Big Data & Society* 5 (2). doi: 10.1177/2053951718818194.
Chadwick, Adrian, M. 2004. "'Geographies of sentience' – an introduction to space, place and time." In *Stories from the landscape*, edited by Adrian M. Chadwick, 1–31. Oxford: ArchaeoPress.
Champion, Erik. 2008. "Otherness of Place: Game-based Interaction and Learning in Virtual Heritage Projects." *International Journal of Heritage Studies* 14 (3):210–228. doi: 10.1080/13527250801953686.
Champion, Erik. 2013. "History and Cultural Heritage in Virtual Environments." In *The Oxford Handbook of Virtuality*, edited by Mark Grimshaw. Oxford: Oxford University Press.
Champion, Erik. 2015. *Critical Gaming: Interactive History and Virtual Heritage*. Edited by Marilyn Deegan, Lorna Hughes, Andrew Prescott, and Harold Short, *Digital Research in the Arts and Humanities*. Farnham: Ashgate Publishing.
Champion, Erik. 2019. "From Historical Models to Virtual Heritage Simulations." In *Der Modelle Tugend 2.0: Digitale 3D-Rekonstruktion als virtueller Raum der architekturhistorischen Forschung*, edited by Piotr Kuroczyński, 337–351. Heidelberg: arthistoricum.net.
Champion, Erik, and Bharat Dave. 2007. "Dialing Up the Past." In *Theorizing Digital Cultural Heritage: A Critical Discourse*, edited by Fiona Cameron and Sarah Kenderdine. Cambridge, Massachusetts: The MIT Press.
Champion, Erik, and Anna Foka. 2020. "Art History, Heritage Games, and Virtual Reality." In *The Routledge Companion to Digital Humanities and Art History*, edited by Kathryn Brown. London/New York: Routledge.
Champion, Erik, and Hafizur Rahaman. 2019. "3D Digital Heritage Models as Sustainable Scholarly Resources." *Sustainability* 11 (8). doi: 10.3390/su11082425.
Chapman, Adam, Anna Foka, and Jonathan Westin. 2016. "Introduction: what is historical game studies?" *Rethinking History* 21 (3):358–371. doi: 10.1080/13642529.2016.1256638.
Chapman, John, and Bisserka Gaydarska. 2007. *Parts and Wholes: Fragmentation in Prehistoric Context*. Oxford: Oxbow.
CHEurope. 2018. "Joint Research Seminar 2 – Doing Critical Heritage: Issues, Methodologies, Challenges." CHEurope, accessed 19th July. http://cheurope-project.eu/activities/jrs-2-amsterdam/.
Ch'ng, Eugene, Vincent Gaffney, and Henry Chapman. 2013. "Digital Heritage: Concluding Thoughts." In *Visual Heritage in the Digital Age*, edited by Eugene Ch'ng, Vincent Gaffney and Henry Chapman. London: Springer.
Christen, Kimberly. 2005. "Gone Digital: Aboriginal Remix and the Cultural Commons." *International Journal of Cultural Property* 12 (03). doi: 10.1017/s0940739105050186.
Coleridge, Samuel Taylor. 2004. "Biographia Literaria, or Biographical Sketches of My Literary Life and Opinions." Salt Lake City: Project Gutenberg. Original edition, 1817. ePUB. https://www.gutenberg.org/files/6081/6081-h/6081-h.htm (accessed 26th October 2021).
Connerton, Paul. 1989. *How Societies Remember*. Cambridge: Cambridge University Press.
Conway, Paul. 2014. "Digital transformations and the archival nature of surrogates." *Archival Science* 15 (1):51–69. doi: 10.1007/s10502-014-9219-z.

Cooke, Steven, and Krystal Buckley. 2021. "Visual research methodologies and the heritage of 'everyday' places." In *People-Centred Methodologies for Heritage Conservation: Exploring Emotional Attachments to Historic Urban Places*, edited by Rebecca Madgin and James Lesh. London: Routledge.
Coombe, Rosemary J. 2017. "Frontiers of Cultural Property in the Global South." In *The Routledge Companion to Cultural Property*, edited by Jane Anderson and Haidy Geismar. London: Routledge.
Darvill, Timothy. 2009a. Historic Environment. In *The Concise Oxford Dictionary of Archaeology*, edited by Timothy Darvill. Oxford: Oxford University Press.
Darvill, Timothy. 2009b. Sites and Monuments Record (SMR). In *The Concise Oxford Dictionary of Archaeology*. Oxford: Oxford University Press.
Darvill, Timothy, and Andrew Fulton. 1998. *MARS: The Monuments at Risk Survey of England 1995 Main Report*. Bournemouth and London: School of Conservation Sciences, Bournemouth University and English Heritage.
Dave, Bharat. 2008. "Virtual heritage – Mediating space, time and perspectives." In *New Heritage: New Media and Cultural Heritage*, edited by Yehuda Kalay, Thomas Kvan and Janice Affleck, 40–52. London: Routledge.
De Certeau, Michel. 1998. "Ghosts in the City." In *The Practice of Everyday Life Volume 2: Living and Cooking*, edited by Michel De Certeau, Luce Girard and Pierre Mayol. Minneapolis: The University of Minneapolis Press. Original edition, 1994.
De Certeau, Michel. 2011. *The Practice of Everyday Life*. Translated by Steven Rendall. Berkeley: University of California Press. Original edition, 1984.
Debray, Régis. 1996. *Media Manifestos: On the technological transmission of cultural forms*. Translated by Eric Rauth. London/New York: Verso Books.
Debray, Régis. 2000. *Transmitting Culture*. Translated by Eric Rauth. New York: Columbia University Press. Original edition, 1997.
Debray, Régis, and Eric Rauth. 1995. "The Three Ages of Looking." *Critical Inquiry* 21 (3):529–555.
Deleuze, Gilles, and Felix Guattari. 2005. *A Thousand Plateaus: Capitalism and schizophrenia*. Translated by Brian Massumi. Minneapolis: University of Minnesota Press. Original edition, 1980.
Dell'Unto, Nicoló, Giacomo Landeschi, Anne-Marie Leander Touati, Matteo Dellepiane, Marco Callieri, and Daniele Ferdani. 2016. "Experiencing Ancient Buildings from a 3D GIS Perspective: a Case Drawn from the Swedish Pompeii Project." *Journal of Archaeological Method and Theory* 23 (1):73–94.
Denard, Hugh. 2012. "A New Introduction to the London Charter." In *Paradata and Transparency in Virtual Heritage*, edited by Anna Bentkowska-Kafel, Hugh Denard, and Drew Baker. Farnham: Ashgate Publishing, ltd.
Derrida, Jacques. 1998. *Archive Fever: A Freudian Impression, Religion and Post-modernism*. Chicago & London: University of Chicago Press.
Djindjian, François. 2015. "Computers and Mathematics in Archaeology: Anatomy of an Ineluctable Success!" In *CAA 2014 – 21st Century Archaeology, Concepts, Methods and Tools. Proceedings of the 42nd Annual Conference on Computer Applications and Quantitative Methods in Archaeology*, edited by François Giligny, François Djindjian, Laurent Costa, Paola Moscati, and Sandrine Robert. Oxford: ArchaeoPress.
Dovey, Kim, and Mirjana Ristic. 2015. "Mapping urban assemblages: the production of spatial knowledge." *Journal of Urbanism: International Research on Placemaking and Urban Sustainability* 10 (1):15–28. doi: 10.1080/17549175.2015.1112298.
Drucker, Joanna. 2020. *Visualization and Interpretation: Humanistic approaches to display*. Cambridge: The MIT Press.
Duggan, Mike. 2017. "Questioning "digital ethnography" in an era of ubiquitous computing." *Geography Compass* 11 (5). doi: 10.1111/gec3.12313.
Duggan, Mike. 2021. "Embracing the plurality of the carto-sphere." *Dialogues in Human Geography*. doi: 10.1177/20438206211028244.
Dunn, Stuart. 2019. *A History of Place in the Digital Age, Digital Research in the Arts and Humanities*. Abingdon: Routledge.
Dunn, Stuart, Graeme Earle, Anna Foka, and Will Wootton. 2019. "Spatial Narratives in

Museums and Online: The Birth of the Digital Object Itinerary." In *Museums and Digital Culture: New Perspectives and Research*, edited by Tula Giannini and Jonathan P. Bowen, 253–271. Cham: Springer International Publishing.
Eco, Umberto. 1995. "On the Impossibility of Drawing a Map of the Empire at a Scale of 1 to 1." In *How to Travel with a Salmon & Other Essays*, edited by Umberto Eco and William Weaver, 84–94. London: Minerva.
Economou, Maria, and Laia Pujol Tost. 2007. "Evaluating the Impact of New Technologies on Cultural Heritage Visitors." In *Technology strategy, management and socio-economic impact*, edited by Jim McLoughlin, Jaime Kaminski and Babak Sodagar. Budapest: Archaeolingua.
Edgeworth, Matt. 2018. "More than just a record: active ecological effects of archaeological strata." In *Historical Archaeology and Environment*, edited by Marcos Andre Torres de Souza and Diogo Menezes Costa, 19–40. Cham: Springer.
Elkin, Lauren. 2017. *Flâneuse: Women Walk the City in Paris, New York, Tokyo, Venice and London*. London: Vintage. Original edition, 2016.
Ellegård, Kajsa. 2019. "The roots and diffusion of time-geography." In *Time Geography in the Global Context: An Anthology*, edited by Kajsa Ellegård. London: New York: Routledge.
Ellenberger, Kate. 2017. "Virtual and Augmented Reality in Public Archaeology Teaching." *Advances in Archaeological Practice* 5 (3):305–309. doi: 10.1017/aap.2017.20.
Engberg, Maria, and Jay David Bolter. 2015. "MRx and the aesthetics of locative writing." *Digital Creativity* 26 (3–4):182–192. doi: 10.1080/14626268.2015.1100120.
Engberg, Maria, and Per Linde. 2018. "Turmoil Alley & the Fableing of Cities." In *Looking Forward, Looking Back: Interactive Digital Storytelling and Hybrid Art Approaches*, edited by Rebecca Rouse and Mara Dionisio. Pittsburgh: Carnegie Mellon ETC Press.
Epstein Nord, Deborah. 1995. *Walking the Victorian Streets: Women, Representation and the City*. Ithaca: London: Cornell University Press.
Ernst, Wolfgang, and Jussi Parikka, eds. 2013. *Digital Memory and the Archive*. Minneapolis: University of Minnesota Press.
European Commission. 2018. "The Innovative Training Networks." accessed 11th February. https://ec.europa.eu/research/mariecurieactions/actions/get-funding/innovative-training-networks_en.
Evans, Tim N. L. 2013. "Holes in the Archaeological Record? A Comparison of National Event Databases for the Historic Environment in England." *The Historic Environment: Policy & Practice* 4 (1):19–34. doi: https://doi.org/10.1179/1756750513Z.00000000023.
Evans, Tim N. L. 2015. "A Reassessment of Archaeological Grey Literature: Semantics and paradoxes." *Internet Archaeology [online]* 40. doi: https://doi.org/10.11141/ia.40.6.
Finch, Jonathan. 2013. "Historic Landscapes." In *The Routledge Companion to Landscape Studies*, edited by Peter Howard, Ian Thompson and Emma Waterton. London: Routledge.
Flinn, Andrew, and Anna Sexton. 2013. "Research on community heritage: Moving from collaborative research to participatory and co-designed research practice." Nexus, Confluence, and Difference: Community Archives meets Community Informatics: Prato CIRN Conference Oct 28–30 2013, Monash Centre, Prato Italy.
Flower, Crispin. 2019. "A Guide to the Ordnance Survey Archaeological Records." Exegesis Spatial Data Management, accessed 18th November. https://www.esdm.co.uk/a-guide-to-the-ordnance-survey-archaeological-records.
Flynn, Bernadette. 2013. "The Morphology of Space in Virtual Heritage." In *Theorizing Digital Cultural Heritage: A Critical Discourse*, edited by Fiona Cameron and Sarah Kenderdine. Cambridge, Massachusetts: The MIT Press.
Flyvbjerg, Bent. 2006. "Five Misunderstandings about Case-Study Research." *Qualitative Inquiry* 12 (2):219–245.
Foka, Anna, Coppélie Cocq, Phillip I. Buckland, and Stefan Gelfgren. 2021. "Mapping Socio-ecological Landscapes: Geovisualization as method." In *Routledge International Handbook of Research Methods in Digital Humanities*, edited by Kristen Schuster and Stuart Dunn. Abingdon: Routledge.
Foka, Anna, David A. McMeekin, Kyriaki Konstantinidou, Nasrin Mostofian, Elton Barker, O. Cenk Demiroglu, Ethan Chiew, Brady Kiesling, and Linda Talatas. 2021.

"Mapping Ancient Heritage Narratives with Digital Tools." In *Virtual Heritage: A Guide*, edited by Erik Champion, 55–65. London: Ubiquity Press.
Foka, Anna, Anna Misharina, Viktor Arvidsson, and Stefan Gelfgren. 2018. "Beyond humanities qua digital: Spatial and material development for digital research infrastructures in HumlabX1." *Digital Scholarship in the Humanities* 33 (2):264–278. doi: 10.1093/llc/fqx008.
Foka, Anna, Jonathan Westin, and Adam Chapman. 2018. "Digital Technology in the Study of the Past." *Digital Humanities Quarterly* 12 (2).
Forte, Maurizio. 2011. "Cyber-Archaeology: Notes on the simulation of the past." *Virtual Archaeology Review* 2 (4):7–18.
Forte, Maurizio, and Helena Murteira. 2020. "Introduction." In *Digital Cities: Between History and Archaeology*, edited by Maurizio Forte and Helena Murteira, 1–10. Oxford: Oxford University Press.
Foucault, Michel. 1986. "Of Other Spaces." *Diacritics* 16 (1):22–27.
Foucault, Michel. 1988. ""Technologies of the Self." Lectures at University of Vermont Oct. 1982." In *Technologies of the Self*, edited by Luther H. Martin, Huck Gutman and Patrick H. Hutton. Amherst: University of Massachusetts Press.
Foucault, Michel. 1991. "Governmentality." In *The Foucault Effect: Studies in Governmentality*, edited by Graham Burchell, Colin Gordon and Peter Miller, 87–104. Chicago: The University of Chicago Press.
Foucault, Michel. 1995. *Discipline and Punish: The Birth of the Prison*. New York: Vintage. Original edition, 1975.
Foucault, Michel, and Joseph Pearson, eds. 2001. *Fearless Speech*. Los Angeles: Semiotext(e).
Foultier, Christophe. 2020. "Community involvement in times of social insecurity." In *Securing Urban Heritage: Agents, Access and Securitization*, edited by Heike Oevermann and Eszter Gantner. London: Routledge.
Fowler, Chris. 2010. "Relational Personhood as a Subject of Anthropology and Archaeology: Comparative and Complementary Analyses." In *Archaeology and Anthropology: Understanding Similarity, Exploring Difference*, edited by Duncan Garrow and Thomas Yarrow, 137–159. Oxford: Oxbow.
Frank, Sybille. 2015. "Urban Commons and Urban Heritage." In *Heritage as Common(s) Common(s) as Heritage*, edited by Henrik Benesch, Feras Hammami, Ingrid Holmberg and Evren Uzer. Gothenburg: Makadam.
Fredholm, Susanne, and Krister Olsson. 2017. "Managing the image of the place and the past: contemporary views on place branding and heritage management." *Place Branding and Public Diplomacy* 14 (3):141–151. doi: 10.1057/s41254-017-0068-4.
Gabrys, Jennifer. 2011. *Digital Rubbish: A natural history of electronics*. Ann Arbor: University of Michigan Press.
Galloway, Anne. 2004. "Playful Mobilities: Ubiquitous Computing in the City." Alternative Mobility Futures Conference, 9–11th January 2005.
Garden, Mary-Catherine E. 2006. "The Heritagescape: Looking at Landscapes of the Past." *International Journal of Heritage Studies* 12 (5):394–411. doi: 10.1080/13527250600821621.
Gardinge, Agneta. 2018. "Our History." Riksantikvarieämbetet, Last Modified 2021, accessed 24th June. https://www.raa.se/in-english/swedish-national-heritage-board/our-history/.
Gill, Alexander. 2021. "Development-led Archaeology and Public Benefit from a Swedish Perspective." *Internet Archaeology [online]* 57. doi: https://doi.org/10.11141/ia.57.4.
Gilman, Paul. 2004. "Sites and Monuments Records and Historic Environment Records in England: Is Cinderella Finally Going to the Ball?" *Internet Archaeology [online]* 15. doi: https://doi.org/10.11141/ia.15.3.
Göteborgs Stad. 2012. "Min Stad." Göteborgs Stad, accessed 7th June. http://minstad.goteborg.se/minstad/index.do.
Gottlieb, Owen. 2017. "Time travel, labour history, and the null curriculum: new design knowledge for mobile augmented reality history games." *International Journal of Heritage Studies* 24 (3):287–299. doi: 10.1080/13527258.2017.1325768.
Granström, Helena. 2013. "Elements in Games for Virtual Heritage Applications." Master's,

Informatics, Högskolan i Skövde.
Guidi, Gabriele, Bernard Frischer, Monica De Simone, Andrea Cioci, Alessandro Spinetti, Luca Carosso, Laura Loredana Micoli, Michele Russo, and Tommaso Grasso. 2005. "Virtualizing ancient Rome: 3D acquisition and modeling of a large plaster-of-Paris model of imperial Rome." Electronic Imaging 2005.
Gunnarson, Fredrik. 2018. "Archaeological Challenges, Digital Possibilities: Digital Knowledge Development and Communication in Contract Archaeology." Licentiate Degree, Department of Cultural Sciences, Linnaeus University (Lnu Licentiate No. 21, 2018).
Hall, Stuart. 1999. "Whose Heritage? Un-settling 'the Heritage, Re-imagining the Post-nation." *Third Text* 13 (49):3–13. doi: 10.1080/09528829908576818.
Hall, Stuart. 2005. "Encoding/Decoding." In *Culture, Media, Language: Working Papers in Cultural Studies 1972–79*, edited by Stuart Hall, Dorothy Hobson, Andrew Lowe and Paul Willis, 117–127. London: Centre for Contemporary Cultural Studies, University of Birmingham/Routledge. Original edition, 1980.
Harman, Graham. 2009. *Prince of Networks: Bruno Latour and Metaphysics*, *Anamnesis*. Prahan: re.press.
Harrison, Rodney. 2011. "'Counter-Mapping' Heritage, Communities and Places in Australia and the UK." In *Local Heritage, Global Context: Cultural Perspective on Sense of Place*, edited by John Schofield and Rosy Szymanski, 79–98. Farnham: Ashgate.
Harrison, Rodney. 2013. *Heritage: Critical Approaches*. London/New York: Routledge.
Harrison, Rodney. 2015. "Beyond "Natural" and "Cultural" Heritage: Toward an Ontological Politics of Heritage in the Age of Anthropocene." *Heritage & Society* 8 (1):24–42. doi: 10.1179/2159032x15z.00000000036.
Harrison, Rodney. 2016. "Archaeologies of Emergent Presents and Futures." *Historical Archaeology* 50 (3):165–180.
Harrison, Rodney, Caitlin DeSilvey, Cornelius Holtorf, and Sharon Macdonald. 2020. "'For ever, for everyone …'." In *Heritage Futures: Comparative Approaches to Natural and Cultural Heritage Practices*, edited by Rodney Harrison, Caitlin DeSilvey, Cornelius Holtorf, Sharon Macdonald, Nadia Bartolini, Esther Breithoff, Harald Fredheim, Antony Lyons, Sarah May, Jennie Morgan and Sefryn Penrose, 3–19. London: UCL Press.
Harrison, Rodney, Hana Morel, Maja Maricevic, and Sefryn Penrose. 2017. Heritage and Data: Challenges and Opportunities for the Heritage Sector. Report of the Heritage Data Research Workshop held Friday 23 June 2017 at the British Library, London. London: British Library.
Harvey, David. 2013. "Emerging Landscapes of Heritage." In *The Routledge Companion to Landscape Studies*, edited by Peter Howard, Ian Thompson and Emma Waterton. London: Routledge.
Hay, Andrew. 2011. "On the Shore of Interpretation: The Theory and Reading of the Image in Imagism." *Connotations* 21 (2/3):304–326.
Hazan, Susan, and Anna Lobovikov Katz. 2017. "The Willing Suspension of Disbelief: The Tangible and the Intangible of Heritage Education in E Learning and Virtual Museums." In *Mixed Reality and Gamification for Cultural Heritage*, edited by Marinos Ioannides, Nadia Magnenat-Thalmann and George Papagiannakis, 549–566. Cham: Springer International Publishing.
Heidegger, Martin. 2013. *Poetry, Language, Thought*. New York: Harper Perennial Modern Thought. Original edition, 1971.
Hermon, Sorin, and Franco Niccolucci. 2018. "Digital authenticity and the London Charter." In *Authenticity and cultural heritage in the age of 3D digital reproductions*, edited by Paola Di Giuseppantonio Di Franco, Fabrizio Galeazzi and Valentina Vassallo. Cambridge: McDonald Institute for Archaeological Research, University of Cambridge.
Herring, Peter. 2013. "Valuing the Whole Historic Landscape." In *The Routledge Companion to Landscape Studies*, edited by Peter Howard, Ian Thompson and Emma Waterton. London: Routledge.
Hewitson, Nigel. 2019. "The Disconnect between Heritage Law and Policy: How Did We Get

Here and Where are We Going?" *The Historic Environment: Policy & Practice*: 1–8. doi: 10.1080/17567505.2019.1645760.
Hewitt, Lucy E., and John Pendlebury. 2013. "Local associations and participation in place: change and continuity in the relationship between state and civil society in twentieth-century Britain." *Planning Perspectives* 29 (1):25–44. doi: 10.1080/02665433.2013.802655.
Hicks, Dan. 2020. *The Brutish Museums: The Benin Bronzes, Colonial Violence and Cultural Restitution*. London: Pluto Press.
Hicks, Dan. 2021. "Let's Keep Colston Falling." ArtReview, accessed 22nd June. https://artreview.com/lets-keep-colston-falling/.
Hicks, Dan, and Nicholas Mirzoeff. 2020. "Fallism and restitution: Removing racist statues and returning looted art objects." *New African* August/September 603 (478).
Hinton, Peter. 2013. "The National Planning Policy Framework and Archaeology: A Response – How Did the Profession Come to This?" *Papers from the Institute of Archaeology* 22. doi: 10.5334/pia.392.
Historic England. 2021. "Apprenticeships in the Heritage Sector." Historic England, accessed 18th June. https://historicengland.org.uk/services-skills/training-skills/work-based-training/heritage-apprenticeships/.
Hoel, Aud Sissel, and Iris van der Tuin. 2012. "The Ontological Force of Technicity: Reading Cassirer and Simondon Diffractively." *Philosophy & Technology* 26 (2):187–202. doi: 10.1007/s13347-012-0092-5.
Holbraad, Martin, and Morten Axel Pedersen. 2017a. "Introduction: The Ontological Turn in Anthropology." In *The Ontological Turn: An Anthropological Exposition*, edited by Martin Holbraad and Morten Axel Pedersen, 1–29. Cambridge: Cambridge University Press.
Holbraad, Martin, and Morten Axel Pedersen. 2017b. "Other Ontological Turns." In *The Ontological Turn: An Anthropological Exposition*, edited by Martin Holbraad and Morten Axel Pedersen, 30–68. Cambridge: Cambridge University Press.
Holmes-Skelton, Georgina. 2019. "For Everyone? Finding a Clearer Role for Heritage in Public Policy-making." *The Historic Environment: Policy & Practice* 10 (3–4):363–379. doi: 10.1080/17567505.2019.1645801.
Holtorf, Cornelius. 2011. "My Historic Environment." *The Historic Environment: Policy & Practice* 2 (2):157–159. doi: https://doi.org/10.1179/175675011x13122044136596.
Holtorf, Cornelius. 2017. "The Meaning of Time Travel." In *The Archaeology of Time Travel: Experiencing the Past in the 21st Century*, edited by Bodil Petersson and Cornelius Holtorf. Oxford: Archaeopress.
Hornborg, Alf. 2016. *Global Magic: Technologies of Appropriation from Ancient Rome to Wall Street*. New York: Palgrave Macmillan.
Howard, Peter. 2009. "Historic Landscapes and the Recent Past: Whose History?" In *Valuing Historic Environments*, edited by John Pendlebury, Lisanne Gibson and Professor Brian Graham. Oxford: Routledge.
Huvila, Isto. 2013. "Sorting the metaverse out and how metaverse is sorting us out." In *The Immersive Internet – Reflections on the Entangling of the Virtual with Society, Politics and the Economy*, edited by Robin Teigland and Dominic Power. London: Palgrave Macmillan.
Illich, Ivan. 1982. *Gender*. New York: Pantheon Books.
Illsley, William R. 2019. "Problematising the Historic Environment Record: Comments on persistent issues in England and Sweden." *Conservation and Management of Archaeological Sites* 21 (2):113–134.
Ingold, Tim. 2010. "Bringing Things to Life: Creative Entanglements in a World of Materials." *NCRM Working Paper Series* 15.
Ingvarsson, Jonas. 2020. *Towards a Digital Epistemology: Aesthetics and Modes of Thought in Early Modernity and the Present Age*. Cham: Palgrave Macmillan.
Insole, Peter. 2017. "Crowdsourcing the Story of Bristol." In *Urban Archaeology, Municipal Government and Local Planning*, edited by Sherene Baugher, Douglas R. Appler and William Moss, 53–68. Cham: Springer.
International Forum of Virtual Archaeology. 2011. *Principles of Seville: International Principles*

of Virtual Archaeology. Seville: International Forum of Virtual Archaeology.
Irigaray, Luce. 1993. *An Ethics of Sexual Difference*. Translated by Carolyn Burke and Gillian C. Gill. London: The Athlone Press. Original edition, 1984.
Jacobs, Jane. 1961. *The Death and Life of Great American Cities*. New York: Vintage Books.
Jakobsen, Ulf, David Novák, Julian D. Richards, Benjamin Štular, and Holly Wright. 2021. "Digital Archiving in Archaeology: The State of the Art " *Internet Archaeology [online]* 58.
Jeffrey, Stuart, Siân Jones, Mhairi Maxwell, Alex Hale, and Cara Jones. 2020. "3D visualisation, communities and the production of significance." *International Journal of Heritage Studies*:1–16. doi: 10.1080/13527258.2020.1731703.
Jones, Andrew M. 2012a. "Into the Future." In *The Oxford Handbook of Archaeology*, edited by Chris Gosden, Barry Cunliffe and Rosemary A. Joyce, 89–114. Oxford: Oxford University Press.
Jones, Andrew M. 2012b. *Prehistoric Materialities: Becoming Material in Prehistoric Britain and Ireland*. Oxford: Oxford University Press.
Jones, Christopher. 2014. "The Future of History is Mobile: Experiencing Heritage on Personal Devices." In *Digital Heritage and Culture: Strategy and Implementation*, edited by Herminia Din and Wu Steven, 177–193. New Jersey: World Scientific.
Jones, J. H., A. C. Pisor, K. G. Douglass, R. B. Bird, E. Ready, A. Hazel, J. Hackman, K. L. Kramer, T. A. Kohler, H. Pontzer, and M. C. Towner. 2021. "How can evolutionary and biological anthropologists engage broader audiences?" *Am J Hum Biol* 33 (4):e23592. doi: 10.1002/ajhb.23592.
Jones, Siân. 2016. "Wrestling with the Social Value of Heritage: Problems, Dilemmas and Opportunities." *Journal of Community Archaeology & Heritage* 4 (1):21–37. doi: https://doi.org/10.1080/20518196.2016.1193996.
Jones, Siân, Stuart Jeffrey, Mhairi Maxwell, Alex Hale, and Cara Jones. 2017. "3D heritage visualisation and the negotiation of authenticity: the ACCORD project." *International Journal of Heritage Studies*:1–21. doi: 10.1080/13527258.2017.1378905.
Kelly, Kenneth G., and Neil Norman. 2007. "Historical Archaeologies of Landscape in Atlantic Africa." In *Envisioning Landscapes: Situations and Standpoints in Archaeology and Heritage*, edited by Dan Hicks, Laura McAtackney and Graham Fairclough, 172–193. Walnut Creek, California: Left Coast Press.
Kenderdine, Sarah. 2016. "Embodiment, Entanglement, and Immersion in Digital Cultural Heritage." In *A New Companion to Digital Humanities*, edited by Susan Schriebman, Ray Siemans and John Unsworth, 22–41. Chichester: Wiley Blackwell.
Kenderdine, Sarah, and Jeffrey Shaw. 2014. "A Cultural Heritage Panorama: Trajectories In Embodied Museography." In *Digital Heritage and Culture: Strategy and Implementation*, edited by Herminia Din and Wu Steven, 197–218. New Jersey: World Scientific.
Klee, Paul. 1992. *Notebooks Volume 2 – The nature of nature*. Translated by Heinz Norden. New York: The Overlook Press. Original edition, 1970.
Klima- og miljødepartementet. 1978. Lov om kulturminner. Oslo: Lovdata.
Kokalj, Ziga, Peter Pehani, Helen Goodchild, Vincent Gaffney, and Krištof Oštir. 2013. "Crossing Borders: A Multi-Layer GIS Mapping Framework for the Cultural Management of the Mundo Maya Region." In *Visual Heritage in the Digital Age*, edited by Eugene Ch'ng, Vincent Gaffney and Henry Chapman. London: Springer.
Kristiansen, Kristian. 1998. "Between Rationalism and Romanticism." *Current Swedish Archaeology* 6:115–122.
Kristiansen, Kristian. 2009. "Contract archaeology in Europe: An experiment in diversity." *World Archaeology* 41 (4):641–648. doi: 10.1080/00438240903371486.
Kristiansen, Kristian. 2019. "CHEurope: Critical Heritage Studies for Europe." In *Heritage explorations across Europe: CHEurope, interdisciplinary training network in critical heritage studies*, edited by Łukasz Bugalski and Maria Pia Guermandi. Bologna: Istituto per i beni artistici culturali e naturali della Regione Emilia-Romagna.
Kristiansen, Kristian. forthcoming. "Towards a New Prehistory: Re-Theorizing Genes, Culture, and Migratory Expansions." In *Homo Migrans: Modeling Mobility and Migration in Human History*, edited by Megan Daniels. Buffalo: SUNY Press.
Kristiansen, Kristian, and Michael Rowlands. 1998. *Social transformations in archaeology:*

Global and local perspectives. London/New York: Routledge.
Kulturdepartementet. 2016. Lag om ändring i kulturmiljölagen (Historic Environment Act). Sweden: Svensk författningssamling (Swedish Code of Statutes).
Kuroczyński, Piotr. 2020. "Security, digitalization and visualization." In *Securing Urban Heritage: Agents, access and securitization*, edited by Heike Oevermann and Eszter Gantner. London: Routledge.
Larsson, Åsa M., Marcus Smith, Rikard Sohlenius, and Tord Klafver. 2017. "Digitising the Archaeological Process at the Swedish National Heritage Board: producing, managing and sharing archaeological information." *Internet Archaeology [online]* 43. doi: https://doi.org/10.11141/ia.43.6.
Larsson, Göran. 2019. "Att humaniora uppfattas som diffust är ett problem för humanister." *Göteborgs Posten*. https://www.gp.se/kultur/kultur/att-humaniora-uppfattas-som-diffust-är-ett-problem-för-humanister-1.18973916.
Latour, Bruno. 1986. "Visualisation and Cognition: Drawing Things Together." In *Knowledge and Society Studies in the Sociology of Culture Past and Present*, edited by Henrika Kucklick. Greenwich, Conn: Jai Press.
Latour, Bruno. 1987. *Science in Action: How to follow scientists and engineers through society*. Cambridge: Harvard University Press.
Latour, Bruno. 1988. *The Pasteurization of France*. Translated by Alan Sheridan and John Law. Cambridge, Massachusetts: Harvard University Press.
Latour, Bruno. 1993. *We Have Never Been Modern*. Translated by Catherine Porter. Cambridge: Harvard University Press.
Latour, Bruno. 1999. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge; London: Harvard University Press.
Latour, Bruno. 2002. "What Is Iconoclash? Or Is There A World Beyond The Image Wars?" In *Iconoclash, Beyond the Image-Wars in Science, Religion and Art*, edited by Peter Weibel and Bruno Latour. Cambridge, MA: MIT Press.
Latour, Bruno. 2003. "What if we Talked Politics a Little?" *Contemporary Political Theory* 2 (2):143–164. doi: 10.1057/palgrave.cpt.9300092.
Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
Latour, Bruno. 2010. *On the Modern Cult of Factish Gods*. Durham; London: Duke University Press.
Latour, Bruno. 2013. *An Inquiry into Modes of Existence: An Anthropology of the Moderns*. Translated by Catherine Porter. Cambridge, Massachusetts: Harvard University Press.
Latour, Bruno, and Adam Lowe. 2011. "The migration of the aura, or how to explore the original through its fac similes." In *Switching Codes: Thinking Through Digital Technology in the Humanities and the Arts*, edited by Thomas Bartscherer and Roderick Coover, 275–297. Chicago; London: University of Chicago Press.
Latour, Bruno, and Steve Woolgar. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press.
Law, John. 2009. "Actor Network Theory and Material Semiotics." In *The New Blackwell Companion to Social Theory*, edited by Bryan S. Turner, 141–158. Chichester: Wiley-Blackwell.
Lefebvre, Henri. 1991. *The Production of Space*. Translated by Donald Nicholson-Smith. Oxford: Blackwell Publishing. Original edition, 1974.
Lefebvre, Henri. 2009a. "Reflections on the Politics of Space." In *State, Space, World: Selected Essays*, edited by Henri Lefebvre, Stuart Elden and Neil Brenner. Minneapolis: University of Minnesota Press. Original edition, 1970.
Lefebvre, Henri. 2009b. "Space and Mode of Production." In *State, Space, World: Selected Essays*, edited by Henri Lefebvre, Stuart Elden and Neil Brenner. Minneapolis: University of Minnesota Press. Original edition, 1970.
Leibniz, Gottfried Wilhelm, and Samuel Clarke. 2000. *Correspondence*. Indianapolis: Hackett Publishing.
Leroi-Gourhan, André. 1993. *Gesture and speech*. Translated by Anna Bostock Berger. Cambridge, Massachusetts: The MIT Press. Original edition, 1964.

Liang, Jianming, Jianhua Gong, and Wenhang Li. 2018. "Applications and impacts of Google Earth: A decadal review (2006–2016)." *ISPRS Journal of Photogrammetry and Remote Sensing* 146:91–107. doi: 10.1016/j.isprsjprs.2018.08.019.
Lindhé, Cecilia. 2013. "'A Visual Sense is Born in the Fingertips': Towards a Digital Ekphrasis." *Digital Humanities Quarterly* 7 (1):1–21.
Lindqvist, Sven. 1978. *Gräv där du står: Hur man utforskar ett jobb*. Stockholm: Bonnier.
Ljungar-Chapelon, Magali. 2017. "The Kivik Grave, Virtual Bodies in Ritual Procession: Towards New Artistic Interactive Experiences for Time Travellers." In *The Archaeology of Time Travel: Experiencing the Past in the 21st Century*, edited by Bodil Petersson and Cornelius Holtorf, 47–78. Oxford: ArchaeoPress.
Low, Setha M. 2017. "Emotion, affect and space." In *Spatializing Culture: The Ethnography of Space and Place*, edited by Setha M Low. London; New York: Routledge.
Löwenborg, Daniel, Maria Jonsson, Åsa Larsson, and Johan Nordinge. 2021. "A Turn Towards the Digital. An Overview of Swedish Heritage Information Management Today." *Internet Archaeology [online]* 58. doi: https://doi.org/10.11141/ia.58.19.
Lowenthal, David. 1981. "Dilemmas of Preservation." In *Our Past Before Us: Why Do We Save It?*, edited by David Lowenthal and Marcus Binney. London: Temple Smith.
Lowenthal, David. 1985. *The Past is a Foreign Country*. Cambridge: Cambridge University Press.
Lowenthal, David. 1998. *The Heritage Crusade and the Spoils of History*. Cambridge: Cambridge University Press.
Lowenthal, David. 2015. *The Past Is a Foreign Country – Revisited*. Cambridge: Cambridge University Press.
MacDonald, Sharon. 2013. "The European Memory Complex: Introduction." In *Memorylands: Heritage and Identity in Europe Today*, 1–26. London/New York: Routledge.
MacEachren, Alan M., Mark Gahegan, William Pike, Isaac Brewer, Guoray Cai, Eugene Lengerich, and Frank Hardisty. 2004. "Geovisualization for knowledge construction and decision support." *IEEE Computer Graphics and Applications* 24 (1):13–17. doi: doi: 10.1109/MCG.2004.1255801.
Marcus, George E., and Erkan Saka. 2016. "Assemblage." *Theory, Culture & Society* 23 (2–3):101–106. doi: 10.1177/0263276406062573.
Markevičienė, Jūratė. 2012. "The spirit of the place – the problem of (re)creating." *Journal of Architecture and Urbanism* 36 (1):73–81. doi: 10.3846/20297955.2012.679789.
Mattern, Shannon. 2016. "Of Mud, Media, and the Metropolis." *Cultural Politics* 12 (3):310–331. doi: 10.1215/17432197-3648870.
Mattioli, Fabio. 2014. "Unchanging boundaries: the reconstruction of Skopje and the politics of heritage." *International Journal of Heritage Studies* 20 (6):599–615. doi: 10.1080/13527258.2013.818569.
Mayer, Margit. 2016. "Neoliberal Urbanism and Uprisings across Europe." In *Urban Uprisings: Challenging Neoliberal Urbanism in Europe*, edited by Margit Mayer, Catharina Thörn and Håkan Thörn, 57–92. London: Palgrave Macmillan.
Mayer, Margit, Catharina Thörn, and Håkan Thörn. 2016. *Urban Uprisings: Challenging Neoliberal Urbanism in Europe*. London: Palgrave Macmillan.
McFarlane, Colin. 2011. "The City as Assemblage: Dwelling and Urban Space." *Environment and Planning D: Society and Space* 29 (4):649–671. doi: 10.1068/d4710.
McKeague, Peter. 2021. "More than monuments." *GEO: connexion* 20 (3):45–47.
McLuhan, Marshall. 2010. *Understanding Media: The Extensions of Man*. New York/London: Routledge Classics.
Meskell, Lynn. 2010. "Human Rights and Heritage Ethics." *Anthropological Quarterly* 83 (4):839–860.
Meskell, Lynn. 2015. "Introduction: Globalizing Heritage." In *Global Heritage: A Reader*, edited by Lynn Meskell, 1–21. Chichester: Wiley Blackwell.
Meskell, Lynn, and Colette Scheermeyer. 2008. "Heritage as Therapy: Set Pieces from the New South Africa." *Journal of Material Culture* 13 (2):153–173. doi: 10.1177/1359183508090899]www.sagepublications.com.
Ministry of Housing, Communities & Local Government. 2019. National Planning Policy Framework. London: HMSO.

Morel, Hana. 2019. "Policy and Practice of London's Historic Environment." *The Historic Environment: Policy & Practice*:1–26. doi: 10.1080/17567505.2019.1574098.
Mosler, Saruhan. 2019. "Everyday heritage concept as an approach to place-making process in the urban landscape." *Journal of Urban Design* 24 (5):778–793. doi: 10.1080/13574809.2019.1568187.
Mostmans, Lien, and Eva Van Passel. 2013. "Audiovisual Collections in Digital Culture: Reflections on Providers and Users of Digital Audiovisual Heritage in Flanders." In *The Digital Turn: User's Practices and Cultural Transformations*, edited by Pille Runnel, Pille Pruulman-Vengerfedlt, Piret Viires and Martin Laak, 71–85. Frankfurt am Main: Peter Lang GmbH.
Mota Santos, Paula. 2017. "The concept of 'first-place' as an Aristotelean exercise on the Metaphysics of Heritage." *International Journal of Heritage Studies* 24 (2):121–127. doi: 10.1080/13527258.2017.1393448.
Mouffe, Chantal. 2005. *On The Political*. Abingdon: Routledge.
Müller, Martin. 2015. "Assemblages and Actor-networks: Rethinking Socio-material Power, Politics and Space." *Geography Compass* 9 (1):27–41. doi: 10.1111/gec3.12192.
Murray, Diana. 1999. "Ordnance Survey and the Depiction of Antiquities on Maps: Past, Present and Future. The Current and Future Role of the Royal Commissions as Suppliers of Heritage Data to the Ordnance Survey." In *CAA97 Computer Applications and Quantitative Methods in Archaeology: Proceedings of the 25th Anniversary Conference, University of Birmingham, April 1997*, edited by Lucie Dingwall, Sally Exon, Vincent Gaffney, Sue Laflin and Martijn van Leusen. Oxford: ArchaeoPress.
Næss, Arne. 2005. "Reflections on Gestalt Ontology." *The Trumpeter* 21 (1):119–128.
Næss, Arne. 2016. *The Ecology of Wisdom*. London: Penguin Modern Classics. Original edition, 2008.
Naguib, Saphinaz-Amal. 2015. "The Articulation of Cultural Memory and Heritage in Plural Societies." In *The Formative Past and the Formation of the Future: Collective Remembering and Identity Formation*, edited by Terje Stordalen and Saphinaz-Amal Naguib. Oslo: Novus Press.
Newman, Martin. 2009. "Devil's Advocate or Alternate Reality? Keeping Archaeology in Heritage." In *Taking Archaeology Out of Heritage*, edited by Emma Waterton and Laurajane Smith, 170–191. Newcastle upon Tyne: Cambridge Scholars Publishing.
Newman, Martin. 2011. "The Database as Material Culture." *Internet Archaeology [online]* 29. doi: https://doi.org/10.11141/ia.29.8.
Ní Chíobháin Enqvist, Delia. 2018. "Digital Maritime Sights: Digital visual documentation and communication in Scandinavian contract maritime archaeology." Licentiate Degree, Department of Cultural Sciences, Linnaeus University (Lnu Licentiate No. 18, 2018).
Norberg-Schulz, Christian. 1980. *Genius loci: Towards a phenomenology of architecture*: London: Academy ed.
Nourse, Nicholas, Peter Insole, and Julian Warren. 2017. "Having a lovely time: Localized crowdsourcing to create a 1930s street view of Bristol from a digitized postcard collection." In *Participatory Heritage*, edited by Henriette; Roued-Cunliffe and Andrea Copeland, 153–162. London: Facet Publishing.
O'Gorman, Marcel. 2006. *E-Crit: Digital Media, Critical Theory and the Humanities*. Toronto/Buffalo: University of Toronto Press.
Olsen, Bjørnar. 2010. *In Defense of Things: Archaeology and the Ontology of Objects*. Lanham: AltaMira Press.
Olsen, Bjørnar, and Christopher Witmore. 2015. "Archaeology, symmetry and the ontology of things. A response to critics." *Archaeological Dialogues* 22 (02):187–197. doi: 10.1017/s1380203815000240.
Önal, Okan. 2008. "Development of a Soil Classification Program for Smart Mobile Devices Using Microsoft Visual Basic." *Journal of Engineering Sciences* 14 (1):49–54.
Papadopoulos, Constantinos. 2018. "Photorealism and Digital Reconstruction." In *The Encyclopedia of Archaeological Sciences*, 1–4.
Papmehl-Dufay, Ludwig. 2020. "Heritage value from below. A local community perspective on conservation, preservation and authenticity in Sweden." *Cadernos do LEPAARQ*

(UFPEL) 17 (34).
Passfield, Robert M. 2005. "Evaluating Authenticity: Reconstructed Timber Swing Bridges." *IA. The Journal of the Society for Industrial Archeology* 31 (2):5–26.
Petersson, Bodil. 2017. "Anachronism and Time Travel." In *The Archaeology of Time Travel*, edited by Bodil Petersson and Cornelius Holtorf, 281–298. Oxford: Archaeopress Publishing Ltd.
Pétursdóttir, Þóra, and Bjørnar Olsen. 2017. "Theory adrift: The matter of archaeological theorizing." *Journal of Social Archaeology* 18 (1):97–117. doi: 10.1177/1469605317737426.
Plets, Gertjan. 2016. "Heritage bureaucracies and the modern nation state. Towards an ethnography of archaeological systems of government." *Archaeological Dialogues* 23 (02):193–213. doi: 10.1017/s1380203816000222.
Pollock, Griselda. 1988. *Vision and Difference*. London: Routledge.
Pope, Catherine, and Nick Mays. 1995. "Qualitative Research: Reaching the parts other methods cannot reach: An introduction to qualitative methods in health and health services research." *British Medical Journal* 311:42–45. doi: doi: https://doi-org.ezproxy.ub.gu.se/10.1136/bmj.311.6996.42.
Pruulman-Vengerfedlt, Pille, Pille Runnel, and Agnes Aljas. 2013. "Orienting the Heritage Institution towards Participatory Users in the Internet." In *The Digital Turn: User's Practices and Cultural Transformations*, edited by Pille Runnel, Pille Pruulman-Vengerfedlt, Piret Viires and Martin Laak, 13–26. Frankfurt am Main: Peter Lang GmbH.
Pruulman-Vengerfeldt, Pille, Pille Runnel, Martin Laak, and Piret Viires. 2013. "The Challenge of the Digital Turn." In *The Digital Turn: User's Practices and Cultural Transformations*, edited by Pille Runnel, Pille Pruulman-Vengerfeldt, Piret Viires and Martin Laak, 7–13. Frankfurt am Main: Peter Lang GmbH.
Pujol Tost, Laia. 2019. "Did We Just Travel to the Past? Building and Evaluating With Cultural Presence Different Modes of VR-Mediated Experiences in Virtual Archaeology." *Journal on Computing and Cultural Heritage* 12 (1):1–20. doi: 10.1145/3230678.
Pujol Tost, Laia, and Maria Economou. 2009. "Worth a Thousand Words? The Usefulness of Immersive Virtual Reality for Learning in Cultural Heritage Settings." *International Journal of Architectural Computing* 7 (1):157–176. doi: https://doi-org.ezproxy.ub.gu.se/10.1260%2F147807709788549367.
QGIS. 2021. "QGIS: A Free and Open Source Geographic Information System." QGIS, accessed July 20th https://qgis.org/en/site/.
Rabinowitz, Adam. 2015. "The Work of Archaeology in the Age of Digital Surrogacy." In *Visions of Substance: 3D imaging in Mediterranean Archaeology*, edited by Brandon R. Olson and William R. Caraher. Grand Forks: The Digital Press @ The University of North Dakota.
Rahaman, Hafizur, Erik Champion, and Mafkereseb Bekele. 2019. "From photo to 3D to mixed reality: A complete workflow for cultural heritage visualisation and experience." *Digital Applications in Archaeology and Cultural Heritage* 13. doi: 10.1016/j.daach.2019.e00102.
Richards, Julian D. 2021. "Archiving Archaeological Data in the United Kingdom." *Internet Archaeology [online]* 58. doi: https://doi.org/10.11141/ia.58.21.
Richards, Julian D., Ulf Jakobsen, David Novák, Benjamin Štular, and Holly Wright. 2021. "Digital Archiving in Archaeology: The State of the Art. Introduction." *Internet Archaeology [online]* 58. doi: https://doi.org/10.11141/ia.58.23.
Richards-Rissetto, Heather. 2013. "From Mounds to Maps to Models: Visualizing Ancient Architecture across Landscapes." Proceedings of Digital Heritage International Congress, Marseille, France.
Richards-Rissetto, Heather. 2017. "What can GIS + 3D mean for landscape archaeology?" *Journal of Archaeological Science* 84:10–21. doi: 10.1016/j.jas.2017.05.005.
Richards-Rissetto, Heather, and Kristin Landau. 2019. "Digitally-Mediated Practices of Geospatial Archaeological Data: Transformation, Integration, & Interpretation." *Journal of Computer Applications in Archaeology* 2 (1):120–135. doi: 10.5334/jcaa.30.

Richards-Rissetto, Heather, and Rachel Plessing. 2015. "Procedural modeling for ancient Maya cityscapes: Initial methodological challenges and solutions." 2015 Digital Heritage International Congress, Granada.
Rico, Trinidad. 2017. "Technologies, Technocracy, and the Promise of "Alternative" Heritage Values." In *Heritage in Action: Making the Past in the Present*, edited by Helaine Silverman, Emma Waterton and Steve Watson, 217–230. Cham: Springer International Publishing.
Riksantikvarieämbetet. 2016. "Vision för kulturmiljöarbetet 2030: Redovisning av regeringsuppdrag om ett offensivt och angeläget kulturmiljöarbete.", accessed 26th October. http://samla.raa.se/xmlui/handle/raa/9736.
Rossetto, Tania, and Laura Lo Presti. 2021. "Reimagining the national map." *Dialogues in Human Geography*. doi: 10.1177/20438206211017440.
Roussou, Maria. 2002. "Virtual Heritage: From the Research Lab to the Broad Public." In *Virtual Archaeology: Proceedings of the VAST Euroconference, Arezzo 24–25 November 2000*, edited by Franco Niccolucci. Oxford: ArchaeoPress.
Rowlands, Michael. 2020. "Heritage and Cultural Property." In *The Material Culture Reader*, edited by Victor Buchli. London/New York: Routledge. Original edition, 2002.
Rua, Helena, and Pedro Alvito. 2011. "Living the past: 3D models, virtual reality and game engines as tools for supporting archaeology and the reconstruction of cultural heritage – the case-study of the Roman villa of Casal de Freiria." *Journal of Archaeological Science* 38 (12):3296–3308. doi: https://doi.org/10.1016/j.jas.2011.07.015.
Russell, Ian. 2010. "Heritage, Identities and Roots: A critique of arborescent models of heritage and identity." In *Heritage Values in Contemporary Society*, edited by George S. Smith, Phyllis Mauch Messenger and Hilary A. Soderland. Walnut Creek: Left Coast Press.
Schnapp, Alain. 1997. *The Discovery of the Past*. Translated by Ian Kinnes and Gillian Varndell. New York: Harry N. Abrams.
Schofield, Tom, Daniel Foster-Smith, Gönül Bozoğlu, and Christopher Whitehead. 2018. "Co-Producing Collections: Re-imagining a Polyvocal Past with Cultural Probes." *Open Library of Humanities* 4 (1). doi: 10.16995/olh.296.
Sennett, Richard. 1996. *Flesh and Stone: The Body and the City in Western Civilization*. New York: W.W. Norton & Company.
Sennett, Richard. 2003. *The Fall of Public Man*. London: Penguin Books. Original edition, 1977.
Sennett, Richard. 2019. *Building and Dwelling: Ethics for the City*. London: Penguin Books. Original edition, 2018.
Shanks, Michael, and Timothy Webmoor. 2013. "A Political Economy of Visual Media in Archaeology." In *Re-presenting the Past: Archaeology through text and image*, edited by Sheila Bonde and Stephen Houston. Oxford: Oxbow Books.
Shaw, Lawrence, and Keith Challis. 2013. "''There's an App For That'': Building Smartphone Applications to Improve the Ergonomics of Landscape Study, Analysis and Interpretation." In *Visual Heritage in the Digital Age*, edited by Eugene Ch'ng, Vincent Gaffney and Henry Chapman. London: Springer.
Smith, George S., Phyllis Mauch Messenger, and Hilary A. Soderland. 2010. "Introduction." In *Heritage Values in Contemporary Society*, edited by George S. Smith, Phyllis Mauch Messenger and Hilary A. Soderland, 15–26. Walnut Creek, California: Left Coast Press.
Smith, Laurajane. 2006. *Uses of Heritage*. London; New York: Routledge.
Soja, Edward W. 1989. *Postmodern Geographies: The reassertion of space in critical social theory*. London: Verso.
Soja, Edward W. 1996. *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*. Cambridge, Massachusetts: Blackwell.
Stenborg, Per. 2017. "Time Travel Paradoxes and Archaeology." In *The Archaeology of Time Travel: Experiencing the Past in the 21st Century*, edited by Bodil Petersson and Cornelius Holtorf. ArchaeoPress: Oxford.
Stone, Robert, and Takeo Ojika. 2000. "Virtual Heritage: What next?" *IEEE MultiMedia* 7

(2):73–74. doi: 10.1109/93.848434.
Tagesson, Göran. 2017. "The Early Modern Town as Power, Ideology and Modernity." In *Urban Variation. Utopia, Planning and Practice*, edited by Per Cornell, Lars Ersgård and Andrine Nilsen. Raleigh, NC: Lulu Press, Inc.
Tait, Graham, and Ben Wallace. 2019. *A Guide to Historic Environment Records (HERs) in England*. London/Swindon: Historic England.
Tan, Beng-Kiang, and Hafizur Rahaman. 2009. "Virtual Heritage: Reality and Criticism." In *CAAD Futures 2009 Conference: Joining Languages, Cultures and Visions*, edited by Temy Tidafi and Tomas Dorta. Montreal: PU Montreal.
Taylor, Joel, and Laura Kate Gibson. 2016. "Digitisation, digital interaction and social media: Embedded barriers to democratic heritage." *International Journal of Heritage Studies* 23 (5):408–420. doi: 10.1080/13527258.2016.1171245.
Thomas, Julian. 1996. *Time, Culture and Identity: An Interpretative Archaeology*. London/New York: Routledge.
Thomas, Roger. 1997. "English Heritage Funding Policies and Their Impact on Research Strategy." In *Archaeological Resource Management in the UK: An Introduction*, edited by John Hunter and Ian Ralston, 136–148. Stroud: Sutton Publishing Limited.
Tilley, Christopher. 1997. *A Phenomenology of Landscape: Places, Paths and Monuments*. Oxford/Providence: Berg. Original edition, 1994.
Tilley, Christopher. 2001. "Ethnography and Material Culture." In *Handbook of Ethnography*, 258–272. London: SAGE.
Tinybird Interactive AB. 2017. "iPhone and iPad Apps." Tinybird Interactive AB, accessed 16th July. http://tinybird.com.
To, T., D. Nguyen, and G. Tran. 2015. "Automated 3D architecture reconstruction from photogrammetric structure-and-motion: A case study of the One Pilla pagoda, Hanoi, Vietnam." *ISPRS – International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* XL-7/W3:1425-1429. doi: 10.5194/isprsarchives-XL-7-W3-1425-2015.
Tsang, Claire. 2020. "Red Sky at Night: Digital archiving in England 2020." *Internet Archaeology [online]* 58. doi: https://doi.org/10.11141/ia.58.6.
Turner, Martin J. 2016. "Lies, Damned Lies and Visualizations: Will Metadata and Paradat be a Solution or a Curse?" In *Paradata and Transparency in Virtual Heritage*, edited by Anna Bentkowska-Kafel, Hugh Denard and Drew Baker, 135–143. Farnham: Ashgate.
Vandenberghe, Frédéric. 2016. "Régis Debray and Mediation Studies, or How Does an Idea Become a Material Force?" *Thesis Eleven* 89 (1):23–42. doi: 10.1177/0725513607076130.
Vrak. 2021. "Film om museet." Vrak/Swedish National Maritime and Transport Museums, accessed 25th October. https://www.vrak.se/en/vrak-play/#play-modal-2015.
Wachsmuth, David, David J. Madden, and Neil Brenner. 2011. "Between abstraction and complexity." *City* 15 (6):740–750. doi: 10.1080/13604813.2011.632903.
Waterton, Emma. 2010. *Politics, Policy and the Discourses of Heritage in Britain*. Basingstoke: Palgrave Macmillan.
Waterton, Emma, and Laurajane Smith. 2009. *Taking Archaeology Out of Heritage*. Newcastle upon Tyne: Cambridge Scholars Publishing
Waterton, Emma, and Steve Watson. 2013. "Framing theory: Towards a critical imagination in heritage studies." *International Journal of Heritage Studies* 19 (6):546–561. doi: 10.1080/13527258.2013.779295.
Westergren, Ebbe. 2006. *7 steps towards in-depth teaching in historic environments: Time Traveling as an educational method*. Kalmar: Kalmar County Museum.
Westin, Jonathan. 2012. *Negotiating 'Culture', Assembling a Past: The visual, non-visual and the voice of the silent actant, Gothenburg Studies in Conservation*. Gothenburg: University of Gothenburg.
Westin, Jonathan, Anna Foka, and Adam Chapman. 2018. "Humanising places: exposing histories of the disenfranchised through augmented reality." *International Journal of Heritage Studies* 24 (3):283–286. doi: 10.1080/13527258.2017.1378912.
Westin, Jonathan, and Ragnar Hedlund. 2016. "Polychronia – negotiating the popular representation of a common past in Assassin's Creed." *Journal of Gaming & Virtual*

Worlds 8 (1):3–20. doi: 10.1386/jgvw.8.1.3_1.
Wheatley, David. 2004. "Making Space for an Archaeology of Place." *Internet Archaeology [online]* (15). doi: https://doi.org/10.11141/ia.15.10.
Whitehead, Christopher. 2017. Critical heritages and serious play in museums: Engaging with difficulty between Europe and the nation. *CoHERE Critical Archive*. Accessed 19th July 2021.
Whyte, William H. 2018. *The Social Life of Small Urban Spaces*. New York: Project for Public Spaces. Original edition, 1980.
Wickstead, Helen. 2009. "The Uber Archaeologist." *Journal of Social Archaeology* 9 (2):249–271. doi: 10.1177/1469605309104138.
Winter, Tim. 2012. "Beyond Eurocentrism? Heritage conservation and the politics of difference." *International Journal of Heritage Studies* 20 (2):123–137. doi: 10.1080/13527258.2012.736403.
Winter, Tim. 2013. "Heritage studies and the privileging of theory." *International Journal of Heritage Studies* 20 (5):556–572. doi: 10.1080/13527258.2013.798671.
Winter, Tim, and Emma Waterton. 2013. "Critical Heritage Studies." *International Journal of Heritage Studies* 19 (6):529–531. doi: 10.1080/13527258.2013.818572.
Wolff, Janet. 1985. "The Invisible Flâneuse: Women and the Literature of Modernity." *Theory, Culture and Society*:37–46.
Woodwark, John. 1991. "Reconstructing history with computer graphics." *IEEE Computer Graphics and Applications* 11 (1):18–20. doi: 10.1109/38.67693.
Woolford, Kirk, and Stuart Dunn. 2013. "Experimental archeology and serious games: challenges of inhabiting virtual heritage." *Journal on Computing and Cultural Heritage* 6 (4):16:1–16:15. doi: http://dx.doi.org/10.1145/2532630.2532632.
Worcester City Historic Environment Record. 2021. "Explore Worcester. Share your stories." Know Your Place Worcester, accessed 6th May. https://kypworcester.org.uk/contact/.
Yadollahi, Solmaz. 2017. "Prospects of Applying Assemblage Thinking for Further Methodological Developments in Urban Conservation Planning." *The Historic Environment: Policy & Practice* 8 (4):355–371. doi: 10.1080/17567505.2017.1399977.
Yang Wang. 2021. "Building emotional GIS: A spatial investigation of place attachment for urban historic environments in Edinburgh, Scotland." In *People-Centred Methodologies for Heritage Conservation: Exploring Emotional Attachments to Historic Urban Places*, edited by Rebecca Madgin and James Lesh. London: Routledge.
Yarrow, Thomas. 2006. "Sites of Knowledge: Different Ways of Knowing an Archaeological Excavation." In *Ethnographies of Archaeological Practice: Cultural Encounters, Material Transformations*, edited by Matt Edgeworth. Lanham: AltaMira Press.
Yi-Fu Tuan. 2018. *Space and Place: The Perspective of Experience*. Minneapolis: University of Minnesota Press. Original edition, 1977.
Zuljevic, Mela, and Liesbeth Huybrechts. 2021. "Historicising design space: Uses of the past in participatory prefiguring of spatial development." *Design Studies* 73. doi: 10.1016/j.destud.2021.100993.

Paper I

CONSERVATION AND MANAGEMENT OF ARCHAEOLOGICAL SITES
2019, VOL. 21, NO. 2, 113–134
https://doi.org/10.1080/13505033.2019.1638082

Routledge
Taylor & Francis Group

OPEN ACCESS Check for updates

Problematising the Historic Environment Record: Comments on Persistent Issues in England and Sweden

William R. Illsley

Department for Literature, History of Ideas and Religion, University of Gothenburg, Gothenburg, Sweden

ABSTRACT

As a mainstay of local and national cultural heritage management, historic environment records play an effective role in the dissemination of data, particularly in the modern development control process. However, despite their functionality and sustained professional use, these inventories are not unproblematic, particularly in regards to informal usage. Based on the author's professional experience this article will discuss some of the issues which convolute the delivery of historic environment data. These issues can be grouped thematically beneath the banners of fragmentation, interoperability, and accessibility. Underpinning these three topics is the relationship between historic environment records as institutions and digitality as both a cognitive process and a distribution mechanism. From a critical perspective, the extent to which these issues reoccur and inhibit the flow of data will be highlighted by examining the historic environment practice in England and Sweden in the hope that these insights can inform the contemporary approach.

KEYWORDS

Heritage management; data supply; historic environment; digitality

Introduction

Archives, collections, and databases have long been the sources for information used in promoting regional and international growth and development, as well as providing the backdrop to research and tourism. They exist as one of the primary means of disseminating culture from generation to generation (Foster, Benford, and Price 2013, 773). This is equally true of historic environment records (hereafter HERs), which transmit human culture across a vast number of generations. The only hindrance to how vast and how wide is how one defines the 'historic environment'. For the sake of policy and practice, definitions that can be enrolled by the heritage profession at large, such as the UK's National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government 2012) are considered effective. Some definitions are more fluid, such as those of King (2010), who summarises the historic environment to be 'everything that has influenced, or that reflects, our cultures and those of our progenitors'. This in itself is 'all-encompassing' (Holtorf 2011, 157), and far beyond the purely material and tangible that most recording mechanisms are most rigorously able to consolidate. As such it should be considered distinctly interdisciplinary.

CONTACT William R. Illsley william.illsley@lir.gu.se

© 2019 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (http://creativecommons.org/licenses/by-nc-nd/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

Along with determining the relationships between the landscape and national heritage resources, there is also public concern driving the process of managing the historic environment. These notions of heritage, borne from the focus on fixed points in the landscape, monuments, or historic buildings, often transcend societal and sociological change (Fowler 1997), providing not only tangible and visible markers of communal interest but also points for the expression of intangible heritage. Thus, they require careful categorisation and management in gauging significance academically, professionally and socially. As a result, systems of archaeological and cultural resource management are one of the most prominent elements of global heritage practice, with near universal application. Almost every country has some form of national record of heritage assets (Carman 2015, 80), a notion which itself holds some antiquity; the first government-organised inventory of historic buildings in France began in 1837 by the Commission des Monuments Historique (Harrison 2013, 44).

This paper seeks to take a critical approach in identifying several of the persistent issues, the most frequently recurring difficulties, regionally and nationally, which currently problematise the keeping of historic environment records. In exploring the problems in recording the historic environment, I will take a comparative approach, allowing for the identification of prevalent issues and diversity in practice; offering perspectives on the symptoms of the bureaucratisation of heritage; the impact of financial stakeholders and the needs for a more egalitarian outlook towards all of the users of these resources. Based on my own professional familiarity, I have rooted the analysis in the archival practices carried out in England. This will be augmented by analysis of Swedish practices, following claims that the Swedish system is one of the most comprehensive inventories in the world (Rundkvist 2010, 848) and the recent reconfiguration of the state mechanisms of historic environment data delivery. Given the aforementioned globality of historic environment management, limiting the comparison to two countries is pragmatic; one could almost choose any country as a viable analogue.

Digitality and the Historic Environment

Different contexts, even for similar issues, can require different solutions. So before delving into the comparative issues between English and Swedish practices, it is perhaps useful to briefly take the time to focus on an issue that is prominent in both countries in the form of digitality. Digitality, and therefore digitalisation, relates to the process of adoption of digitised material; digitisation, then, being the process in which analogue material is translated into the digital (Gunnarson 2018, 17). With the growing presence and awareness of digitality, both within heritage fields and in the wider humanities, there is a marked effort to allocate attention and resources into realising the 'digital turn'.

As with any discipline or field, it comes with its own technologies and buzzwords, some of which, such as 'interoperability' and 'linked data' are included within this text and are becoming important terminologies within historic environment practice. It is important to remember that this turn does not represent a turn away from or a turn towards 'new culture' (Pruulman-Vengerfeldt et al. 2013), nor does it represent the universal solution – indeed, a digital solution for someone who has been born into a

digitally minded culture growing up with digital technology is not likely to be the same as that of previous generations. What is evident, however, is that digital technologies and their application change the dynamics in the fields they are applied to by altering practices and changing relationships between producer and user.

The latter point is particularly important in the historic environment field, as it is generally developed from a top-down perspective. Recent comment that 'present-day archaeology and heritage management may be much less beneficial for the future than we commonly expect' (Högberg et al. 2018, 640) is particularly true for *in situ* preservation and site management. This appears Knut-like in its attempt to temporarily halt inevitable decay curves, in light of looming climate change, fuel and food security pressures. While limiting landscape use as a means of heritage protection seems naïve in its long-term aspirations, and therefore futile in its short-term aspirations, rigorous incorporation of digitality within the management of the historic environment could be a mitigating factor. This does not mean that digitality should become the goal or destination; a change of format is not the only way to promote culture. Nor should digitality be isolated from the current cultural process (Pruulman-Vengerfeldt et al. 2013). Nonetheless, digitality as a concept has become so closely connected to contemporary heritage practices, it follows that it should also figure heavily in future heritage practices.

To be clear, digitality and the historic environment are not newly introduced; the first forays into digitality centre around the digitisation of analogue material and more perfunctorily, the adoption of computers as a tool. Heritage institutions have already become adept and active users of 'existing digital environments' (Pruulman-Vengerfeldt et al. 2013), such as social media or internet-based platforms and many individual historic environment records are no strangers to this. By exploiting web-based search functions, numerous institutions have found a method of boosting the accessibility of the historic environment by speeding up the process and by making basic search functions more widely available. However, while these digital environments are commonly employed, one could still argue then that an even greater embrace of the digital turn is required.

The increase in egalitarian availability is only a small step; to access social value, the historic environment has to be democratically usable. The proliferation of GIS-based software has made spatial databases universal in archaeology, with a great deal of success through a great variety of applications (Larrain and McCall 2018, 247). There is a temptation to see GIS software merely as a method of making analogue practices quicker, wielded without epistemological or theoretical care (Hacıgüzeller 2012). It has been questioned whether GIS can be effective in understanding the relationship between people and place, with certain studies indicating that mapping functionality can be ineffective in the grand scheme of the results (Corbett and Keller 2006, 27). The functionality and learning curve required can affect crowdsourcing projects as well, though it should be highlighted that many of these issues are a result of over-functionality rather than user-friendliness (Conolly and Lake 2006). In fact, as part of the Know Your Place project conceived by the historic environment team in the city of Bristol, it was made explicitly clear that their volunteers had no queries in regard to the GIS technologies engaged unless they ceased to function (Nourse, Insole, and Warren 2017, 157).

Further application of egalitarian principles to the historic environment could be achieved through visualisation. Visualisation already plays an important role within HERs; the events and records themselves are visualisations or representations of the historic environment. However, to quote Kenderdine (2016, 23), this 'remains largely constrained to 2D small-screen-based analysis, limiting interactive techniques'. Data is still displayed as dots and vectors on a map, simple translations of analogue drawings such as cropmarks and site plans into digital formats. This extent of information visualisation and interface display renders space as being *a priori* and unchanging (Drucker 2016, 241). To this end, the historic environment is reduced to an assemblage of interrelating map points, information rather than knowledge (Lee 2012), denying us the ability to acknowledge a narrative image and to form our own presuppositions and relationship to the world (Megill 2007). In objective settings, such as an HER, visualisation process favours professional use rather than individual use, enabling rapid data collation for the gazetteers required in the planning process; thereby assuming intrinsic worth (Jones 2016, 22–24). Without sufficient mediation, this can fail to encourage public value-based interaction with the historic environment.

Although familiar, maps and 2D distributions remain a positive tool that can be utilised in novel or inspirational settings. It is perhaps the developments in 3D digitisation, however, that most headway is gained. For example, the increasing digitisation in the field, 'at the trowel's edge', allowing onsite interpretation and digital documentation (Dell'Unto et al. 2017), some of the *in situ* preservation issues highlighted earlier can be addressed. Feasibly the documentation of 3D landscapes in GIS can be envisioned for the future of historic environment practice, enabling the pathways to 'new levels of cognition' (Kenderdine 2016, 23) that visualisation can offer users of any background. This optimism is enforced by the development of virtual products, such as the City of Gothenburg's *Min Stad* web portal and application (https://minstad.goteborg.se/minstad/index.do), an annotated 3D visualisation of the city for urban planning and interaction. While *Min Stad* focuses on the development of the contemporary city, in keeping with Gothenburg's official policy of 'citizen dialogue' (Tahvilzadeh 2015; Soneryd and Lindh 2018), its latest iteration also allows for the inclusion of personal stories, addressing the intangible interaction with the city's landmarks, as well as linking to the city museum's archive of historic images. With such precedents, it is not difficult to envisage similar concepts for the historic environment. Techniques such as LiDAR imaging already enhance and present alternative visualisations of the landscape (Challis et al. 2008). This is not to conflate data management with data visualisation, of course. The two are linked, but the problems to which these actions are responses are not the same. Nevertheless, a greater emphasis is placed on the task of managing raw data. As such the solutions to harnessing this data into more cognitive visualisations of the historic environments are not likely to come from within the historic environment sector itself, but from external industries such as urban planning, gaming, and media. This does not absolve the historic environment practice of innovation, but the onus is on the profession for the recognition of potential and utilisation of newer technologies.

There is a criticism that, in general, the skills needed to utilise the historic environment sectors tools and standards are not widely taught in British academia (Lee 2012, 32), even less so the skills needed to harness digitality in the historic environment. From personal experience, one fears that under the climate of austerity measures taken at

local government level, and the tendency to treat HER officers as administrative staff purely within the bureaucratic process of development, rather than heritage professionals negatively impacts the valuing, the dissemination and the significance of the historic environment. As a result, worries over how to digitally enable greater informal use is not of great concern to staff who are required to demonstrate their economic viability.

This is by no means a complete picture. More novel digital formats such as that of augmented reality are being utilised on an individual basis. One such example is Worcester City HER's exploitation of the popular mobile game, Pokémon Go in order to promote historic landmarks and sites in the city (Worcester City Council 2016). The wider county of Worcestershire has taken a less mobile but nonetheless engaging approach to digital experiences in the historic environment. The Worcestershire Archive and Archaeology team is situated within 'The Hive', an integrated public, university and history centre, jointly operated by the county council and the University of Worcester (Creed, Sivell, and Sear 2013, 76). Using a multi-touch table, their goal has been to create a touch table application that is both fun and educational for their audience, ranging from children and school trips, university students, staff members, and older generations. Evaluations of the installation demonstrated the Touching History app to be very positively received, with the general public and staff utilising the table as individuals and in small groups. Furthermore, there was evidence to suggest that users were able to socially learn the required gestures to use the table, though a need to 'subtly and efficiently educate' some older visitors was noted (Creed, Sivell, and Sear 2013, 85).

There is also innovation implemented from above, via Historic England and the Archaeology Data Service (ADS), a digital repository with some 20 years of deployment. As demonstrated in the movement toward the digitalisation of museums, there is great value to be had in identifying best practice from others, particularly within a network of museums (Olsson and Svensson 2013). New approaches to interpretation, which explicitly include digital technologies is part of the national research agenda (Historic England 2017, 8). Unfortunately, the current financial trends often force HERs to rely upon Historic England, rather than mobilisation of the existing network of local authorities. While it has its benefits, the two-tier system in place in England impacts the direction heritage safeguarding can travel. Many HERs sit within local planning authorities (LPA), which remains the most pragmatic option as they essentially become a cost neutral service. However, that leaves an implication that serving the needs of the LPA is the HERs primary role, which Figure 1 (see *Accessibility*) attests to. In contrast, in HERs linked to cultural services, public access, digitality and interoperability are no longer a secondary consideration. The drawback in this scenario is greater financial vulnerability. The question then is how can a balance be achieved?

Digital expression appears more overtly to be a goal of the Swedish historic environment practice. The Digital Archaeological Process (DAP) is a five-year plan developed by the National Heritage Board and is a consequence of the more central approach employed in Sweden. The plan is to improve the workflow of historic environment data between all its actors (Larsson et al. 2017; Smith 2015) which will allow for the recording of a site along with all of its components, not just the reports and syntheses but the raw data produced in the field too. This, coupled with the semantic linking of

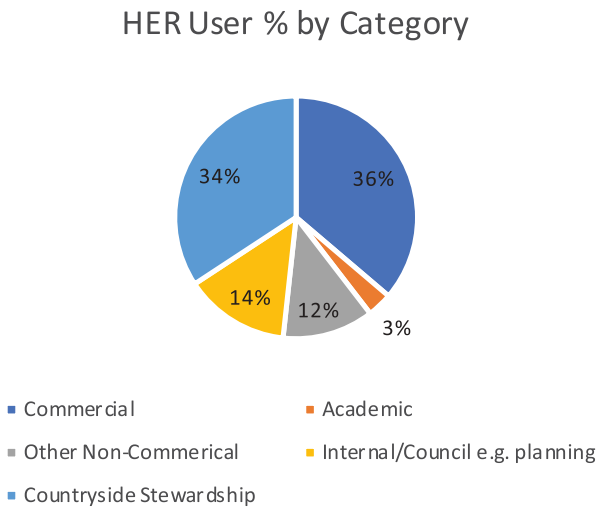


Figure 1. Percentage (based on average number of users) from each user category based on responses to the 2019 Historic England and ALGAO UK HER committee annual survey. Reprinted with permission from Historic England and ALGAO UK.

digital objects using established data standards, further negates the need for inherent information. There are multiple English HERs that already use DOIs to link to databases of grey literature, such as the ADS. Equally, there are still numerous HERs that use database software that does not allow for hyperlinking, or only provides a reference to the syntheses as part of the record.

In truth, the adoption of digitality in historic environment contexts most probably warrants another article, a thesis or more, devoted entirely unto itself, so for practical reasons, it is necessary to keep this section relatively brief in order to cover more operational issues. There is some necessity for this discussion, however, and the adoption of digital processes is influenced by the chronological development of historic environment practices and the approaches taken at national level. In studying both historiographies, there is a suggestion that many of the issues are mature and deeply rooted in the progression of the field.

Historic England and Regional HERs: The English Approach

As a body Historic England, are inextricably linked with historic environment practices in England. While it is too early to fully realise the implications of the publication, their recently published guide to HERs in England (Historic England 2019) sets out the expectations for what is required of an English HER. The historiography of the English HER is long and varied, involving numerous institutional transformations, regulation and increasing levels of state interest (Harrison 2013, 11) resulting in the two-tier system in use today. As a result, a variety of seemingly interchangeable terminologies have been acquired, such as Sites and Monuments Record (SMR) or HER. To some extent, which terminology is used is colloquial. There remains continued informal usage of the SMR

terminology, though semantically HER is certainly the more inclusive and holistic title. The two are not separate entities, however. SMRs evolved almost organically into HERs with the addition of historic buildings, historic landscape characteristics data, and rapid coastal zone assessment. The realisation that replicating existing data in a new database was unnecessary, invoked a need for a new terminology. What follows is a considerably abbreviated version of these events in order to avoid becoming too heavily mired in the various makeovers.

The National Perspective

Recording the historic environment in England was marked by the establishment of the Ancient Monument Protection Act in 1882 (followed in 1900), whereby a select group of inspectors were charged with advising and reporting to the commissioner of works to facilitate state purchase or guardianship of monuments (Harrison 2013, 51). It was not until 1908, with the formation of the Royal Commission on the Historical Monuments of England (RCHME), that the first systematic approach to inventorying the nation's heritage was begun (Carlisle and Lee 2016, 128), reinforcing the Ancient Monuments Protection Acts with definitive lists of the monuments and buildings 'most deserving' of protection. This, in turn, was supported by the development of the National Buildings Record (NBR) in 1940, which became part of the RCHME in the 1960s. In parallel, the Ordnance Survey (OS) routinely recorded and mapped the locations of earthworks, ruins, and the locations of major sites from the outset, leading to the appointment of an Archaeology Officer in the 1920s (Newman 2011; Carlisle and Lee 2016, 129). This data was the result of the work carried out by the National Archaeological Record (NAR) and lead to the card index system employed from 1947 onwards, after C.W. Phillips took over from O.G.S Crawford as OS Archaeology Officer (Phillips 1959). Eventually, the OS' archaeological responsibilities were passed to the RCHME in 1983 and became part of the NAR (Newman 2011). These, in turn, were amalgamated with the NBR to form the National Monuments Record (NMR) in the 1990s (Carlisle and Lee 2016, 129).

Following the merger of the RCHME and the government's advisory body, English Heritage (lately subdivided into the English Heritage Trust and Historic England), the NMR currently stands as two national datasets (Carlisle and Lee 2016, 129). First, there is the National Heritage List for England (NHLE), which lists all statutory and protected sites in the country, including listed buildings, scheduled monuments, protected wrecks, registered parks and gardens, and battlefields. This is definitive, and while the data is available elsewhere, this is the only official and fully informed source. Secondly, there is the National Record of the Historic Environment (NRHE), which is far more comprehensive in a historic environment sense and currently holds over 420,000 records. Despite being a national dataset in practice, the NRHE is not and should not be viewed as conclusive in the same manner as the NHLE. This is due to the coexistence of the historic environment datasets maintained by various authorities on a regional level.

The Regional Perspective

Originally SMRs were held at local government level, usually with the local council as the burdens of heritage fell upon the public purse. According to Gilman and

Newman (2018), the first true SMR to be established was in Oxfordshire, with others following suit due to a growing awareness in light of post-war urban development that information on *in situ* archaeology was sparse. This development took place before Planning Policy Guideline 16 (Department for Communities and Local Government 1990) gave archaeology a statutory position in the planning process, resulting in needless damage and destruction of historic environment material. PPG16 was driven by the environment white paper, *This Common Inheritance*, which moved to levy the cost of environmental but also heritage damage upon the developers and beneficiaries – in other words, the polluter pays (Kearns 1991, 367). By unburdening the public responsibility for the cost, the local authority digging units dissolved but the SMR evidence bases remained with the LPAs and became financially covered by planning fees. If local authorities could inventory and identify archaeology ahead of development, more could be done to manage archaeological risk.

As 'the scope of SMRs has expanded to include historic features across a broad range of landscapes, townscapes, and seascapes' (Darvill 2009), as well as recording the act of archaeological practice itself (Carlisle and Lee 2016, 131), they became known as the HERs in order to reflect this newfound universality. The NPPF rules that local planning authorities do not necessarily need to maintain their own database – at one point Lancashire's dataset was being curated by Lancaster University (Fraser 1997) and even now is maintained only on a voluntary basis on behalf of Lancashire County Council. They must, however, have access to a HER and as a minimum the relevant record should have been consulted when a planning application is to be considered (Ministry of Housing 2012). Resultantly, HERs are operated on various levels of local government such as county councils, district councils, unitary authorities or in certain cases they are covered by specific urban archaeological databases, such as those in Oxford and Winchester. Further to this, other bodies such as The National Trust and the Church of England who operate their own databases, though this is primarily from the perspective of property management (Historic England 2019, 6). Currently, there are 84 local authority HERs operating alongside the NRHE and NHLE, and these are now viewed as the primary repository for historic environment data.

Much is owed to this pattern of growth in the sector. Holding the evidence base within the local authority was often linked to the adoption of digital technologies, mainly because local authorities were early implementers of computer power. As small, often well maintained and non-critical databases, SMRs/HERs were often used as test beds for IT, for example Berkshire County Council first tested their adoption of GIS in their SMR (David Hopkins, county archaeologist at Hampshire CC and formerly Berkshire CC, personal communication and additional thoughts and comments on the topic and this article). In this sense, many SMRs/HERs were ahead of the archaeology sector at the time, though arguably these roles have reversed. Now most, if not all, of these services, have adopted a digital storage and extraction system for the data they originally held in paper format. Not all of them have fully digitised their backlog of paper documents and there remains a great deal of supporting information awaiting OCR scanning. As there is an increasing need to cover costs, the data provision aspect is routinely the priority, and the notion of digitality is often associated with encumbrance and the burdensome task of scanning archaeological literature.

Riksantikvarieämbetet: The Swedish Approach

The current approach the Swedish National Heritage Board, Riksantikvarieämbetet (RAÄ, see https://www.raa.se/), takes is significantly different from the practices of inventory in the UK. Rather than operating a national database as well as regional repositories, the management of the Swedish historic environment has always been provided centrally, though there still remain observable national vs. regional divergences, particularly in regards to how and who carries out archaeological excavation.

The origin of Swedish practice is also far more antiquated than those in the UK. In fact, the first steps towards archaeological resource management as we might recognise it took place by the end of the sixteenth century (Carman 2015). From 1599, Johan Bure (Latinised to Johannes Bureus) and several assistants undertook regular topographic surveys for the collection of runic inscriptions (Carman 2015; Schnapp 1997). Bure was appointed Sweden's first Riksantikvarie in 1630 (Gardinge 2018) and a statute concerning the protection of Swedish antiquities was passed on the very same day. Such marked 'the passing of archaeology into the public domain' (Schnapp 1997).

Despite these early forays into heritage management, it was not until the twentieth century that the practice of inventorying the past in Sweden became as exhaustive or representative as that of the RCHME. As Sweden transitioned from a rural populace to an industrialised nation, sections of the intellectual elite turned to archaeology and history as a galvanising component of national identity (Magnusson Staaf 2000, 182). Modernisation of cities required greater organisation and scale of archaeological recording, for example, the construction of a new sewage system in Malmö in 1907 and the subsequent documentation of the medieval city (Magnusson Staaf 2000, 182). Such developments inevitably require systematic recording and dedicated repositories, which at this point were largely held by regional museums, universities or local history societies. In 1937 however, with the inception of the Fornminnesregistret, the National Heritage Board made the concerted effort to systematically inventory visible ancient remains (Riksantikvarieämbetet 2018). The inventory was collated on a parish by parish basis originally using cadastral maps, though this has since been supplemented by archaeological fieldwork reports (Marcus J. Smith, personal communication, 28 February 2018). Initially, this was recorded in inventory books, but as of the mid-1980s, small-scale digitisation of written material was undertaken. By the 1999 introduction of the Fornminnesinformationssystemet (FMIS), the National Heritage Board began envisioning digital access to the database in its entirety (Riksantikvarieämbetet 2018). This was achieved surprisingly quickly. Although only the counties of Skåne and Gotland had successfully been digitised by 2003, by 2005, data for every county was digitally available, albeit only to heritage professionals (Riksantikvarieämbetet 2018). As of Autumn 2018, FMIS began a new transition as part of the DAP. This culminated with the launch of the new Kulturmiljöregistret (KMR) in February 2019, superseding FMIS and acting as an umbrella system (Larsson et al. 2017) allowing all the data housed in digital archives to be related to the sites and monument recorded in the HER, with the long-term goal of achieving 'reciprocal linking of data across databases and institutions' (Marcus J. Smith, personal communication, 26 June 2018).

Situating KMR within the National Heritage Board is significant in terms of the structure of heritage management in Sweden. Traditionally, the distribution of roles has been well delineated: the County Administrative Boards manage administration and

control; regional County Museums handle collecting and outreach; and the universities focus on research and education (Högberg and Fahlander 2017, 14). The delineation of this structure is maintained by KMR and each role remains distinctive. Crucially, this favourably impacts upon funding; the austerity measures in place in English LPAs often demand internal heritage actors compete for financial resources. By comparison, holding HERs within the local planning authorities often requires one institution covering multiple roles. Usually, this is in the areas of administration and control, as well as collecting and outreach, with local museums often falling under the remit the county council. Sweden's approach allows for separate funding sources, and therefore greater potential for development.

There are other differences of note. The urban environment, as both a historic and contemporary architectural context, is not recorded in the same dataset as ancient monuments in Sweden. This is somewhat unusual given that at times Swedish archaeology and architecture have been closely interlinked. Again, to use Malmö as an example, to facilitate the city's modernisation, several medieval and renaissance buildings were torn down to make way for modern replacements, so the cultural resource management efforts at the time were oriented toward the urban environment (Magnusson Staaf 2000, 183). This of course only represents the perspective of the city of Malmö, which has a distinct history from other major cities and towns in Sweden, but it demonstrates the difficulty separating historic buildings studies entirely from archaeology. The relationship with a bygone urban environment, experienced through the lens of archaeology, is somewhat different from the interaction with an extant urban environment, where distinctions between extinct and standing structures can be delineated. This is evident in Sweden's management of historic buildings. While still under the operation of the National Heritage Board, the built environment is recorded separately within the Bebyggelsregistret (BeBR) (Fadeel 2018). Unlike the NHLE, which records only the designated built environment, BeBR allows for the record of all buildings, not just historic or listed buildings. Eighty-thousand entries have been recorded since the record was implemented in 2011, around 13,000 of which are designated National Monuments, Historic Buildings and Church Monuments (Fadeel 2018).

The Comparative Issues

These different trajectories and procedures directly inform perspectives on the operational issues in managing historic environment data in both countries as many of the systemic issues are particularly complex and deep-rooted. They will likely continue to impact the utility of such resources, not only for the commercial and professional heritage sector, but also to academics and members of the public.

Fragmentation

A historic environment record is a skein of archaeology, geography, history, and urban studies among other fields, and as such the ties that bind them together within one collection are not solid. Perhaps, it should be unsurprising then, that the most mutually persistent restriction to the convenience and usefulness of historic environment data is fragmentation. Historic environment fragmentation is embodied in several ways; it is not

merely a case of scattered resources. Fragmentation takes place across the archaeological record; through architectural style; patterns of urban development; regional social and economic conditions; through standards of practice to name but a few. The representativity of the archaeological record itself is frequently fragmented, via taphonomic processes and differential preservation. Even if 'the influence of physical and environmental factors is in general constant in a given geographical and climatic region', (Kristiansen 1985, 7), this is not *a priori* if one considers the impact of the last glacial maximum and the changing land/sea relationships in coastal regions. Then there is the impact of modern urbanisation and settlement geography. Björn Magnusson Staaf (2000) is explicit in this regard, highlighting that 'circumstances surrounding the excavation of a Sami settlement in Lapland are quite different from the investigation of an Iron Age burial site in a densely built-up area in the surroundings of Stockholm'.

These examples of representativity are easily identified within the historic environment, and contemporary practice has evolved to take these factors into account. Understanding and reflecting the various nuances is key, but this is not necessarily compatible with the education and specialisms of all HER officers. Thus, even within a single corpus, there is the fragmentation of standards, varying significantly with each incumbent employee's tenure. Inevitably, it is part of the job to limit these variations as much as possible, however, given the multidisciplinary nature of the task it is unsurprising to find that the recording of different disciplinary aspects is often biased by an HER officer's own background and specialities. While they do not work in isolation – there is often both peer and academic support within the sector – the problems occur in the form of Rumsfeldian 'unknown unknowns'; lacking the prerequisite starting point of the more resolvable 'known unknowns'. As a result, the lack of interdisciplinarity restricts the vision of both the assets and the potential latent and current demand (Montella 2015) of the historic environment as a cultural heritage asset.

The degree to which these variations are problematic can be mitigated against, through personal development or as is often the case, longevity of exposure and work experience. Institutional fragmentation is more difficult to work around and is most frequently demonstrated by the multiple bodies and stakeholders involved in processing and managing historic environment data. In England, these boundary restrictions and delimitations are often closely tied to county boundaries and historic political developments and are heavily intertwined with accessibility issues. Who has responsibility for what areas, given that there are so many different authorities maintaining accessible records, is a regular source of confusion, even within the heritage profession. This is particularly problematic in places such as Hampshire, where the county council maintains a central HER, but is not responsible for the cities of Portsmouth, Southampton and Winchester, who maintain their own datasets. This is further complicated by the New Forest National Park Authority who are responsible for the supply of data within the National Park's boundary but lease the data itself from the county council. This is occasionally further confused by the Isle of Wight, who use several of the county council's ecology service but maintain their own HER, as well as the South Downs National Park Authority, which spans three counties and use the HER services of five different local authorities (South Downs National Park Authority 2018). This is not a unique situation, and intra-county division of the historic environment record is evident through the South West, the Midlands and the North.

It is via historic material type though that the Swedish system is most fragmented. While the centrality of RAÄ's historic environment management negates most of the issues of institutional fragmentation, it is still evident in places, for example, historic maps for which the copyright is held with the National Land Survey Lantmäteriet. Cartographic information pertaining to city fortifications is held in Krigsarkivet, which itself is part of Riksarkivet (the National Archive), as such material is still considered to be a concern of national security as well as a historic resource.

Holding KMR and BeBR as two separate datasets is not ideal from a theoretical standpoint, given that the built environment is rarely mutually exclusive from the historic environment. From a historic buildings perspective, there is no need to translate the raw data into knowledge, as the building itself is the record (Lee 2012, 30) though this only applies if one studies a single building in isolation. As historic environments are in a continuous transformation process (Karakul 2007), the tangible features of both the historic and modern urban landscape are the physical structure around which intangible heritage and cultural expression grows. To separate the two is to divide the historic environment itself. While the data is maintained and provided by the same body, it is somewhat less problematic than the institutional divisions evident in England, but it also makes compatibility and holism harder to achieve.

Interoperability

One problem that both countries share as a result of the fragmentation of records is the double handling of data. Double handling in the Swedish system is rare, but it is generally the result of the recording of historic buildings as monuments within FMIS prior to the conception of BeBR. In England, doublehanding is more common. In theory, this should not be the case, but in practice, with different standards of recording and data handling between institutions and even within institutions, it occasionally becomes difficult to distinguish exactly which records relate to each other and how. Resultantly, interoperability has long been a noted requirement, since any given site or monument may be simultaneously recorded by 'a local authority for development control purposes, a national body for purposes of legal protection, the landowner for land management, or a thematic national survey of sites of a particular type' (Lee 2005). Attempts to minimise the variability of recording standards were introduced in earnest with the introduction of the Forum on Information Standards in Heritage in 2000, and the production of the MIDAS data standard, which essentially provides definitions in the form of metadata to increase the commonality of a dataset (Lee 2005).

Despite this, interoperability remains a potential issue in England. This is due to the variability of information management systems in place throughout the country. This is highlighted by Carlisle and Lee (2016, 132–133); of the 84 HERs operating in England, 75% make use of a single software, HBSMR produced by exeGesiS, while the rest either use in-house systems, alternative off-the-shelf products, such as Intrasis, or they merely get by with database software such as Microsoft Access. In the same paper, it is pointed out that it is perceived that exeGesiS are capable of influencing the development of standards in the historic environment management sector. This is not necessarily problematic in itself, it is not unreasonable to receive consultation from software development, particularly in terms of how to progress technically. This is evident in

the Heritage Information Access Strategy (HIAS) (May 2018), whereby exeGesiS were employed as consultants in determining how best to accession the NRHE into the local HER databases (Flower and Lush 2016). This can still be problematic though, given the wide functionality of HBSMR, such as allowing for customisable chronologies. Most use the MIDAS data standard, but there is encouragement from exeGesiS to modify regional periodisation standards to reflect local conditions and 'change understanding' (Crispin Flower, email addressing herforum@jiscmail.ac.uk, 25 June 2018). This would be understandable on a national level as archaeologies and histories do not always evolve coevally; however, this alternative practice would have serious implications for interoperability, hence the development of the MIDAS data standard in the first instance.

A further problem is how this relates to efforts to improve the interchange of data between the supposed 'authorised' datasets and the contributions of community-led projects (Carlisle and Lee 2016, 133). Given that many such community projects are run by volunteers, complex software solutions, that for the most part are not self-intuitive, are not necessarily compatible with these aims. More importantly, in the scheme of providing a national overview as required by HIAS, any failure to interact with a regional HER becomes a hindrance to this goal. Those HERs who have rejected exeGesiS software, for another provider or in favour of in-house proprietary software must be kept in the loop. In practice, many of those still running incompatible software are not doing so out of choice but out of economic necessity, and in these instances, the cost of upgrading would require the loss of staff or may even represent a threat to the service's existence.

The dynamic of interoperability is slightly different in Sweden as a result of the RAÄ's centralised HER. As if to prove that it is not the universal solution to all ills, digital technology is at the heart of the issue. A contributing factor to data fragmentation and issues of interoperability is arguably a surfeit of funding for digital projects, through the likes of the Swedish Research Council, the Swedish Foundation for Humanities and Social Sciences (Riksbankens Jubileumsfond) and the Royal Swedish Academy of Letters (Kungliga Vitterhetsakademien). These bodies have financed, and continue to finance, a range of different projects, all of which offer different solutions in different fields. Fortunately, an awareness of the necessity of defined structure has already been established, making demands for data management plans compatible with the Swedish National Data Service (SND). This is where interoperability, via metadata and linked data, becomes crucial, as there is a great amount of historic environment data deposited within the SND. However, if sites are to be considered historically valuable, and form the basis for an archaeological narrative, ongoing research and reporting must be part of the feedback mechanism within the historic environment record. Without the essential data, a given site's relevance cannot be accurately assessed, and therefore protected.

As a result, what data belongs where can be troublesome when efforts are made to streamline the workflow of both depositing and distributing historic environment data. Although FMIS (formerly) and BeBR recorded the monuments and buildings themselves, the products of fieldwork, both in terms of the tangible heritage produced as artefactual material and the reports, drawings, notes and photos that form the synthesis of a site are required to be deposited with the local authority, most often a national or local museum (Larsson et al. 2017). However, in this format only analogue data is captured, despite the increasing turn towards digitally produced fieldwork reports over the last 20 years, prompting the switch to KMR. Platforms such as RAÄ's Digisam (http://www.digisam.

se/) bring together state organisations to cooperate in providing useful access to digitised heritage resources, strengthening interoperability and accessibility. Nonetheless, unity between archaeological actors is still required in forwarding the development of a coherent historic environment record within the public domain. The lack of a mandatory register for archaeological fieldwork or events that affect the status of ancient monuments held by the National Heritage Board (Smith 2015) was identified, as has the need for a digital repository for grey literature produced as a result of fieldwork, similar to the ADS or the Dutch depository, EDNA (DANS 2018). Without these repositories, digitally produced site records and post-excavation data are at risk of being lost or excluded from the narrative. The DAP was actioned by the National Heritage Board in direct response to these shortcomings.

Accessibility

The accessibility of historic environment data is very much multifaceted and relates as much to format and display of information, as it does to the mechanisms for extracting the information. It is important when discussing access to HER data to understand what or who usership entails. Different users have different needs and responses. For example, those purely interested in data grabs in relation to development and planning industry tend to be defined as commercial, and numbers tend to ebb and flow in response to demand. Public or community users, however, tend to be more interested in place or representation, benefitting more from solutions focused on content rather than 'medium, process, or professional expertise' (Roued-Cunliffe and Copeland 2017).

From statistical sources, the English system is utilised in the vast majority by contract archaeologists. Using data extracted from the Historic England and ALGAO's Annual Survey, Figure 1 demonstrates that commercial archaeological entities and countryside stewardship schemes are the primary consumers of HER data. As these activities have a financial incentive for HERs it could be argued that they are also the primary drivers, and that this system of inventory is skewed towards professional practice. The Swedish system is also user-driven, albeit via remote access, and while the anecdotal responses from historic environment record officers suggest a similar pattern of usage is apparent, the definitive figures were only available from 2009. It has been noted within the RAÄ that usage has approximately doubled since then, with a number of users from beyond the remit of cultural heritage management, usually interested individuals and the real estate agents (Malin Blomqvist, personal communication, 30 January 2018).

In England, the current arrangement 'works', in that it functions to the extent that heritage consultants and developers can access the data and planning archaeologists can devise appropriate measures of mitigation to lawfully carry out development within NPPF guidelines. Even so, the current situation is inhibitive and can be disruptive. Waiting times and priorities, as well as the availability of staff, vary from authority to authority, since numerous HERs operate with part-time officers. The question of service cost is also relevant to the conversation, as there is no standard price for the cost of a commercial HER search, and the guidelines that are in place allow for generous interpretation. Since the data held in an HER is considered to be public information, it is mostly paid for by funds generated by local and national taxes, it is unlawful to charge for 'accessing information'. However, as per the EIR (Department for Food 2004), it is not

illegal to charge for reasonable costs, and it even recommended that these are recovered and explicit access and charging policies should be put in place (Gilman and Newman 2018). This ought to be measured by staff time and operating cost, but there seems to be no definitive correlation between the amount charged and the actual cost of running the search, with numerous local authorities charging over 100 pounds sterling for what realistically takes no more than two hours. This leaves many on shaky legal ground, especially when one considers that the cost rises inversely in many authorities when asked to perform the search as a priority. This is regularly defended in the context of Public Sector Information Regulations (The National Archives 2018) and is rarely challenged by contractors, who often welcome the cost as a necessary burden to maintain the current levels of custodianship.

Clearly, this is no longer a case of staff time and operating cost, nor is it proportionately egalitarian access to a public resource. This statement requires a degree of clarification, however. Exemptions are commonplace and data access is frequently made freely available for members of the public. Academics are often exempted too, though recent anecdotal evidence from Richard Bradley at a recent conference would indicate that this is not a nationwide policy. The issue is that the attention given to each user demographic is not equal, with beneficiaries that pay most receiving the quickest and best service. This is problematic given that the national planning systems insist this service is provided for. Unfortunately, this is rarely driven by the archaeological representatives of the LPA, and instead is the result of pressure to cover costs by internal and external stakeholders. The cost is regularly justified by stakeholders and commercial heritage professionals as being minimal in the grand scale of modern development, and many would argue that it is worth it to maintain the services currently in place. This should, and does, cause ethical and theoretical concerns for local government archaeologists, but there are many who equally see it as the only means for HERs to continue to exist in the same capacity.

As well as the financial aspects of access, there are further issues closely tied to the problematic aspects of fragmentation. In Sweden, the centrality of the RAÄ and the goals of the DAP largely eliminate this issue, though there are minor issues. There is no agreement with Lantmäteriet or Riksarkivet for the integration of historical maps (Åsa M. Larsson, personal communication, 30 January 2018) for example, meaning for such documents a charge may be levied by the National Archive.

English HERs, meanwhile, perform an admirable and incomparable service for locality-based enquiries. The issues tend to become more apparent when thematic enquiries are required, whereby one must stitch together the results of enquiries from multiple HERs across numerous various sources. The numerous operators that coexist in England and their lack of cohesion inhibit accessibility, but there is also greater depth to the problem.

Resources such as land management and national survey results, as well as the grey literature produced as a result of archaeological fieldwork should be deposited in one or both of the local HER and the NMR, and this inevitably raises the question of which is the definitive source of data. The HIAS guidelines indicate the local HER should be the first point of contact, and according to Historic England's Three Corporate Plan 2018–21 (Historic England 2018, 27), there is a distinct negative trend in sites added to the NHLE, and the pre-application proposals and planning casework advised upon, due in to additions to HERs. Previously users, commercial or otherwise, were required to visit

multiple sources to ascertain the most complete dataset. While to some extent this is still a requirement, not gone unnoticed by either Historic England or within the HER community and positive movement towards rectification are being made.

As well as bespoke HER web portals, aggregation platforms are a route that is being explored. The Swedish model demonstrates that this method of user-focused extraction of historic environment data is clearly viable, and English practice is following suite. The UK Heritage Gateway (https://www.heritagegateway.org.uk/gateway/), for example, is operated in partnership with Historic England, the Association of Local Government Archaeology Officers (ALGAO) and the Institute of Historic Building Conservation (IHBC). An online portal allows users of any background the ability to remotely search multiple national and regional data sources for any location, object or site type, as per the MIDAS data standard. As Figure 2 demonstrates, the majority of HERs surveyed respond positively to the idea of hosting information online, with the majority utilising or planning to utilise the Heritage Gateway.

This is not yet without criticism, perhaps as the 6 HERs that retain local access to their data would argue (the data is anonymised, so the circumstances pertaining to individual HER responses are unknown). There are worries that the online access will either infringe upon the HER position as the definitive data source or undermine the HER by subverting the need for a local enquiry. It is also possible to question the user focus of the Heritage Gateway initiative. While one can register for a Historic England Heritage Passport, allowing one to register their areas of interest, it is not a necessity for accessing the search functions. As such, there is no fixed user profile, or an audience development plan. The literature provided by ALGAO simply indicates Heritage Gateway is most useful as the first port of call for 'smaller projects' (Thompson 2014). Since the HIAS guidelines indicate the local HER should be the contact point for planning casework, the implication is that both HIAS and the Heritage Gateway are aimed at the academic user. As Figure 1 demonstrates, this is a very small sector and resultantly, there are HER officers who limit Heritage Gateway interaction based on this narrow audience field, instead prioritising community-focused initiatives.

It is perhaps the lack of understanding of user needs that is most problematic in terms of accessibility, both locally and online. While it seems that the RAÄ know internally how their system is being used, the figures are not available in support of that. Conversely in the English system, worryingly 75% of the HERs responding to the 2019 Annual Survey are not gathering feedback or surveying user's needs Figure 3a. A similar trend is evident for those that utilise online web portals. Only 15 of the 73 HERs

Answer Options	No. Of Responses (out of 73)	%(to the nearest whole)
✅ Through Heritage Gateway	27	37%
✅ Through Own/3rd party site	12	16%
✅ Through Heritage Gateway & Own/3rd party site	23	32%
⚪ Plan to be on Heritage Gateway	3	4%
⚪ Plan to host own online HER	2	3%
❌ None	6	8%

Figure 2. Approaches to online HER access based on the 2019 Historic England and ALGAO UK HER committee annual survey. Reprinted with permission from Historic England and ALGAO UK.

Answer Options	No. Of Responses (out of 73)	%(to the nearest whole)
✅ All users & stakeholders	1	1%
✅ All users	7	10%
✅ All stakeholders	0	0%
✅ Some users & some stakeholders	4	5%
✅ Some users	6	8%
✅ Some stakeholders	0	0%
❌ None	55	75%

Figure 3a. User research/feedback policies of HERs responding to the 2019 Historic England and ALGAO UK HER committee annual survey. Reprinted with permission from Historic England and ALGAO UK.

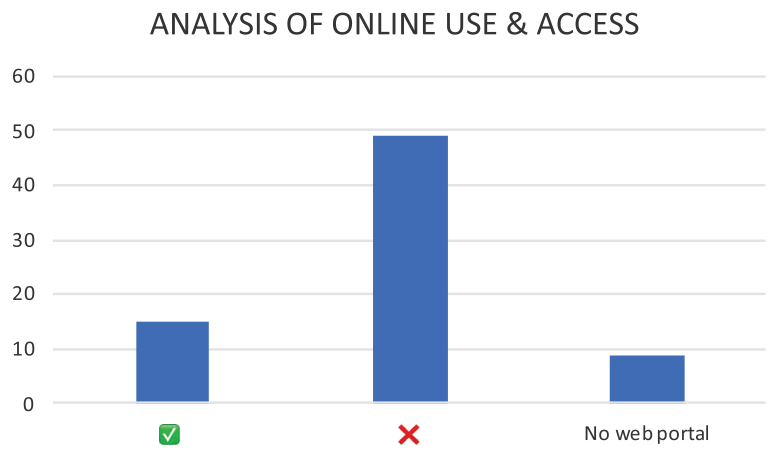


Figure 3b. Online analysis policies of HERs responding to the 2019 Historic England and ALGAO UK HER committee annual survey. Reprinted with permission from Historic England and ALGAO UK.

surveyed carry out analysis of the online use and access to their data Figure 3b. Many of those that do also derive their analysis from Heritage Gateway, which is limited to analytics such as search terms and usage analytics as it stands (Charina Jones, email addressing herform@jiscmail.ac.uk, 1 May 2019). While this is set to change, it leaves the sector critically short on the qualitative understanding of its social value, particularly among its non-commercial usership.

The Historic Environment as a Public Resource

There is clearly still a requirement for local and regional management of the historic environment. The archaeological and scientific expertise championed by national organisations are valid, particularly for the management, curation and conservation of the historic environment in the context of development and modernisation, but as Sian Jones argues, it often fails to capture and embody people's relationships to the historic environment on an informal or non-professional level (Jones 2016, 22). These informal interactions rely upon social value and sense of place. While management against loss

on a commercial scale is necessary, a sense of place is borne of locally realised meaning, the required negotiation of regional community and expertise (Waterton 2005) also has to take place in close vicinity.

There are exemplars within the profession, with a public facing focus rather than serving the planning system. The aforementioned Know Your Place is regularly cited as a benchmark within the HER practice. The project's intention was to 'promote positive Localism' (City Design Group 2011, 3), championing collaborative practice between the HER and local community groups and volunteers. Workshops, a programme of data collection, and new web interface all formed a toolkit to widen public access and engagement with the HER. This approach is already being replicated in the Layers of London, Our Warwickshire, and New Forest Knowledge projects. This community success indicates that even though regional HERs should be encouraged to open access to online users, they must equally remain a presence and feed the management and discourse of historic environment, as they are best placed for public interaction. This is an area in which the Swedish system cannot compare. In these instances, the traditional delineation that community focus is the domain of local cultural institutions, which means that the KMR is almost entirely separated from the local experience.

This leads to a final point regarding custodianship. As Insole (2017, 57) highlights, building a comprehensive heritage database requires sourcing information from beyond the planning process, and therefore requires different strategies for data collection. One such strategy, which as he points out, 'reflects the current zeitgeist' is crowdsourcing (Insole 2017, 60). This approach however significantly alters the role of the database and the expert. In this situation, as demonstrated by the Out Stories (Outstories Bristol 2018) dataset maintained as part of the Know Your Place dataset, enables a community to define and manage their own heritage, using the platform as a means of publication and distribution. In this role, the community can focus on the topic, while the expert takes on the role of curator and facilitator (Westberg Gabriel and Jenssen 2017, 94). This is a significant departure from the current paradigm which enables the local authority to present the data they receive from the source material and choose their own methods of validating and referencing the producer of the data, which is still most frequently the archaeological contractor. Open and easy to access online platforms, characterised by an 'online bazaar' approach, are encouraged (Westberg Gabriel and Jenssen 2017, 93–94). While this presents its own set of preservation and operational challenges, the requirement for local centres and facilitators clearly must remain a presence to feed the management and discourse of historic environment, as they are best placed for community interaction.

Conclusion

Both England and Sweden have deep-rooted ties to cultural resource management, from the early appointment of a Riksantikvarie to the Ancient Monuments Act's first forays into the systematic recording of national heritage. While this was largely a measure of aesthetic values in both states' increasing levels of government involvement in heritage management is evident, resulting in both increasing bureaucratisation and an ever-greater focus on risk management in response to the growing threat of modern development to both known and unknown heritage. This resulted in complex, multi-

stakeholder mechanisms for recording and managing the known historic environment. These systems require careful regulation and in-depth standardisation to maximise interoperability and accessibility for a varied audience. As observed in the article, the mechanisms in place have a varying impact due to persistent structural and conceptual issues. Although much of this relates to what historic environment data is and how it has been stored and disseminated historically, it is proposed that the principles of digitality may mediate several of these issues.

Both Swedish and English approaches have turned to the adoption of digitality over the past two decades, allowing access directly in the historic environment database via a self-service web portal. This approach favours egalitarian access to commercial enterprises, academics and the public alike. In the English context, there are still stumbling blocks in the form of local policy and data fragmentation inhibit realisation in the same way as the centralised Swedish approach achieves. However, where defragmentation and standardisation are encouraged in England; in Sweden, the remote and central approach means cooperation with local repositories to unify the approaches of heritage actors is the call to combine the state operation with the realities of regionality. For both, along with continued encouragement of informal usage, more needs to be done to promote the dissemination of historic environment data and its archives. With a greater cognition and access to more intangible aspects of heritage, the social value and understanding of the historic environment can be improved on a wider scale.

Disclosure Statement

No potential conflict of interest was reported by the author.

Funding

This work was supported by funding from the European Union, through the Marie Skłodowska-Curie Innovative Training Network 'CHEurope: Critical Heritage Studies and the Future of Europe' H2020 Marie Skłodowska-Curie Actions [722416].

Notes on Contributor

William R. Illsley is a PhD candidate and early stage researcher on the CHEurope project. He studies archaeological archives and collections as digital manifestations of heritage.
william.illsley@lir.gu.se

ORCID

William R. Illsley http://orcid.org/0000-0002-8917-663X

References

Carlisle, P., and E. Lee. 2016. "Recording the Past: Heritage Inventories in England." *Journal of Cultural Heritage Management and Sustainable Development* 6 (2): 128–137. doi:10.1108/jchmsd-02-2016-0013.

Carman, J. 2015. *Archaeological Resource Management: An International Perspective*. New York: Cambridge University Press.
Challis, K., Z. Kokalj, M. Kincey, D. Moscrop, and A. J. Howard. 2008. "Airborne Lidar and Historic Environment Records." *Antiquity* 82: 1055–1064. doi:10.1017/S0003598X00097775.
City Design Group. 2011. *Know Your Place: Learning and Sharing Information about Historic Bristol*. Bristol: Bristol City Council.
Conolly, J., and M. Lake. 2006. "Introduction and Theoretical Issues in Archaeological Gis." In *Geographical Information Systems in Archaeology*, edited by J. Conolly and M. Lake, 1–10. Cambridge: Cambridge University Press.
Corbett, J., and P. Keller. 2006. "Using Community Information Systems to Communicate Traditional Knowledge Embedded in the Landscape." *Participatory Learning and Action* 54: 21–27.
Creed, C., J. Sivell, and J. Sear. 2013. "Multi-Touch Tables for Exploring Heritage Content in Public Spaces." In *Visual Heritage in the Digital Age*, edited by E. Ch'ng, V. Gaffney, and H. Chapman, 67–90. London: Springer.
DANS. 2018. "E-depot Voor De Nederlandse Archeologie." *Rijksdienst voor het Cultureel Erfgoed*. Accessed 13 March 2018. https://archeologieinnederland.nl/bronnen-en-kaarten/e-depot-voor-de-nederlandse-archeologie
Darvill, T. 2009. "Sites and Monuments Record (SMR)." In *The Concise Oxford Dictionary of Archaeology*, edited by T. Darvill, 420–421. Oxford: Oxford University Press.
Dell'Unto, N., G. Landeschi, J. Apel, and G. Poggi. 2017. "4D Recording at the Trowel's Edge: Using Three-dimensional Simulation Platforms to Support Field Interpretation." *Journal of Archaeological Science: Reports* 12: 632–645. doi:10.1016/j.jasrep.2017.03.011.
Department for Communities and Local Government. 1990. *Planning Policy Guidance 16: Archaeology and Planning*. London: HMSO. https://www.wyreforestdc.gov.uk/media/115277/NP25-PPG16-Archaeology-and-Planning.pdf
Department for Food, Environment and Rural Affairs. 2004. "The Environmental Information Regulations." http://www.legislation.gov.uk/uksi/2004/3391/contents/made
Drucker, J. 2016. "Graphical Approaches to the Digital Humanities." In *A New Companion to Digital Humanities*, edited by S. Schriebman, R. Siemans, and J. Unsworth, 238–250. Chichester: Wiley Blackwell.
Fadeel, E. 2018. "About BeBR." *Riksantivarieämbetet*. Accessed 5 March 2018. https://www.raa.se/in-english/digital-services/about-bebr/
Flower, C., and M. J. Lush. 2016. *Data Supply and Reconciliation between NRHE and HERs – End-of Project Report*. Talgarth: exeGesiS Spatial Data Management.
Foster, J., S. Benford, and D. Price. 2013. "Digital Archiving as Information Production." *Journal of Documentation* 69 (6): 773–785. doi:10.1108/jd-04-2012-0047.
Fowler, P. 1997. "Archaeology in a Matrix." In *Archaeological Resource Management in the UK: An Introduction*, edited by J. Hunter and I. Ralston, 1–10. Stroud: Sutton Publishing.
Fraser, D. 1997. "The British Archaeological Database." In *Archaeological Resource Management in the UK*, edited by J. Hunter and I. Ralston, 19–29. Stroud: Sutton Publishing.
Gardinge, A. 2018. "Our History." *Riksantikvarieämbetet*. Accessed 1 March 2018. https://www.raa.se/in-english/swedish-national-heritage-board/our-history/
Gilman, P., and M. Newman. 2018. "Informing the Future of the Past: Guidelines for Historic Environment Records." *Historic England*. Accessed 27 February 2018. http://archaeologydataservice.ac.uk/ifp/Wiki.jsp?page=Main
Gunnarson, F. 2018. "Archaeological Challenges, Digital Possibilities: Digital Knowledge Development and Communication in Contract Archaeology." Licentiate thesis, Linnaeus University.
Hacıgüzeller, P. 2012. "GIS, Critique, Representation and Beyond." *Journal of Social Archaeology* 12 (2): 245–263. doi:10.1177/1469605312439139.
Harrison, R. 2013. *Heritage: Critical Approaches*. London: Routledge.
Historic England. 2017. *Research Agenda*. Swindon: Historic England.
Historic England. 2018. *Three Year Corporate Plan 2018–21*. Swindon: Historic England.

Historic England. 2019. *A Guide to Historic Environment Records (hers) in England*. Swindon: Historic England.
Högberg, A., and F. Fahlander. 2017. "The Changing Roles of Archaeology in Swedish Museums." *Current Swedish Archaeology* 25: 13–19.
Högberg, A., C. Holtorf, S. May, and G. Wollentz. 2018. "No Future in Archaeological Heritage Management?" *World Archaeology* 49 (5): 639–647. doi:10.1080/00438243.2017.1406398.
Holtorf, C. 2011. "My Historic Environment." *The Historic Environment: Policy & Practice* 2 (2): 157–159. doi:10.1179/175675011x13122044136596.
Insole, P. 2017. "Crowdsourcing the Story of Bristol." In *Urban Archaeology, Muncipal Government and Local Planning*, edited by S. Baugher, D. R. Appler, and W. Moss, 53–68. Cham: Springer.
Jones, S. 2016. "Wrestling with the Social Value of Heritage: Problems, Dilemmas and Opportunities." *Journal of Community Archaeology & Heritage* 4 (1): 21–37. doi:10.1080/20518196.2016.1193996.
Karakul, Ö. 2007. "Folk Architecture in Historic Environments: Living Spaces for Intangible Cultural Heritage." *Millî Folklor: Uluslararasi Kültür Arastirmalari Dergis* 75: 151–163.
Kearns, G. 1991. "This Common Inheritance: Green Idealism Versus Tory Pragmatism." *Journal of Biogeography* 18 (4): 363–370. doi:10.2307/2845478.
Kenderdine, S. 2016. "Embodiment, Entanglement, and Immersion in Digital Cultural Heritage." In *A New Companion to Digital Humanities*, edited by S. Schriebman, R. Siemans, and J. Unsworth, 22–41. Chichester: Wiley Blackwell.
King, T. F. 2010. "My Historic Environment." *The Historic Environment: Policy & Practice* 1 (1): 103–104. doi:10.1179/175675010x12662480108992.
Kristiansen, K. 1985. "Post-Depositional Formation Processes and the Archaeological Record." In *Archaeological Formation Processes: The Representativity of Archaeological Remains from Danish Prehistory*, edited by K. Kristiansen, 7–11. Copenhagen: Nationalmuseets Forlag.
Larrain, A. Á., and M. K. McCall. 2018. "Participatory Mapping and Participatory GIS for Historical and Archaeological Landscape Studies: A Critical Review." *Journal of Archaeological Method and Theory* 26 (2): 643–678. doi:10.1007/s10816-018-9385-z.
Larsson, Å. M., M. Smith, R. Sohlenius, and T. Klafver. 2017. "Digitising the Archaeological Process at the Swedish National Heritage Board: Producing, Managing and Sharing Archaeological Information." *Internet Archaeology* 43. doi:10.11141/ia.43.6.
Lee, E. 2005. "Building Interoperability for United Kingdom Historic Environment Information Resources." *D-Lib Magazine* 11 (6): 179–185. doi:10.1045/dlib.magazine.
Lee, E. 2012. "'Everything We Know Informs Everything We Do': A Vision for Historic Environment Sector Knowledge and Information Management." *The Historic Environment: Policy & Practice* 3 (1): 28–41. doi:10.1179/1756750512z.0000000006.
Magnusson Staaf, B. 2000. "The Rise and Decline(?) of the Modern in Sweden: Reflected through Cultural Resource Management Archaeology." *Current Swedish Archaeology* 8: 179–194. https://lup.lub.lu.se/search/publication/322c475e-8e6d-4f6d-a1d8-b597537671ac
May, K. 2018. "Heritage Information Access Strategy." *Historic England*. Accessed 12 March 2018. https://historicengland.org.uk/research/support-and-collaboration/heritage-information-access-strategy/
Megill, A. 2007. *Historical Knowledge, Historical Error: A Contemporary Guide to Practice*. Chicago: University of Chicago Press.
Ministry of Housing, Communities & Local Government. 2012. *National Planning Policy Framework*. London: HMSO.
Montella, M. 2015. "The Post-Modern Context." In *Cultural Heritage and Value Creation: Towards New Pathways*, edited by G. M. Golinelli, 1–6. Cham: Springer International Publishing Switzerland.
The National Archives. 2018. "The Re-Use of Public Sector Information Regulations." Accessed 18 July 2018. http://www.legislation.gov.uk/uksi/2015/1415/regulation/15/made
Newman, M. 2011. "The Database as Material Culture." *Internet Archaeology* 29. doi:10.11141/ia.29.8.

Nourse, N., P. Insole, and J. Warren. 2017. "Participatory Heritage." In *Having a Lovely Time: Localized Crowdsourcing to Create a 1930s Street View of Bristol from a Digitized Postcard Collection*, edited by H. Roued-Cunliffe and A. Copeland, 153–162. London: Facet Publishing.

Olsson, T., and A. Svensson. 2013. "Reaching and Including Digital Visitors: Swedish Museums and Social Demand." In *The Digital Turn: User's Practices and Cultural Transfromations*, edited by P. Runnel, P. Pruulman-Vengerfedlt, P. Viires, and M. Laak, 45–60. Frankfurt am Main: Peter Lang Academic Research.

Outstories Bristol. 2018. "Mapping LGBT+ Bristol." Accessed 20 November 2018. http://outstories bristol.org.uk/map/#osb/kyp/115

Phillips, C. W. 1959. "Archaeology and the Ordnance Survey." *Antiquity* 33 (131): 195–204. doi:10.1017/S0003598X00027496.

Pruulman-Vengerfeldt, P., P. Runnel, M. Laak, and P. Viires. 2013. "The Challenge of the Digital Turn." In *The Digital Turn: User's Practices and Cultural Transformations*, edited by P. Runnel, P. Pruulman-Vengerfeldt, P. Viires, and M. Laak, 7–13. Frankfurt am Main: Peter Lang Academic Reserch.

Riksantikvarieämbetet. 2018. "Bakgrund till Fornminnesinformationen." *Riksantikvarieämbetet*. Accessed 1 March 2018. https://www.raa.se/hitta-information/fornsok/om-fornsok/bakgrun den-till-fornsok/

Roued-Cunliffe, H., and A. Copeland. 2017. "Introduction: What Is Participatory Heritage?." In *Participatory Heritage*, edited by H. Roued-Cunliffe and A. Copeland, XV–XXI. London: Facet Publishing.

Rundkvist, M. 2010. "Prospects for Sweden." *Antiquity* 84 (325): 848–852. doi:10.1017/ S0003598X00100262.

Schnapp, A. 1997. *The Discovery of the Past*. Translated by Ian Kinnes and Gillian Varndell. New York: Harry N. Abrams.

Smith, M. J. 2015. "The Digital Archaeological Workflow: A Case Study from Sweden." In *CAA 2014 – 21st Century Archaeology, Concepts, Methods and Tools. Proceedings of the 42nd Annual Conference on Computer Applications and Quantitative Methods in Archaeology*, edited by F. Giligny, F. Djindjian, L. Costa, P. Moscati, and S. Robert, 215–220. Oxford: Archaeopress.

Soneryd, L., and E. Lindh. 2018. "Citizen Dialogue for Whom? Competing Rationalities in Urban Planning, the Case of Gothenburg, Sweden." *Urban Research & Practice* 1–17. doi:10.1080/ 17535069.2018.1436721.

South Downs National Park Authority. 2018. "Historic Environment Records." *South Downs National Park Authority*. Accessed 6 March 2018. https://www.southdowns.gov.uk/discover/heritage/ secrets-of-the-high-woods/historic-environment-records/

Tahvilzadeh, N. 2015. "Understanding Participatory Governance Arrangements in Urban Politics: Idealist and Cynical Perspectives on the Politics of Citizen Dialogues in Göteborg, Sweden." *Urban Research & Practice* 1–17. doi:10.1080/17535069.2015.1050210.

Thompson, I. 2014. "HER Services and Research Projects in England." *ALGAO*. Accessed 15 July. https://www.algao.org.uk/sites/default/files/documents/HER_Services_and_Research_projects_ in_England_final_version.pdf.

Waterton, E. 2005. "Whose Sense of Place? Reconciling Archaeological Perspectives with Community Values: Cultural Landscapes in England." *International Journal of Heritage Studies* 11 (4): 309–325. doi:10.1080/13527250500235591.

Westberg Gabriel, L., and T. Jenssen. 2017. "Who Is the Expert in Participatory Culture?" In *Participatory Heritage*, edited by H. Roued-Cunliffe and A. Copeland, 87–97. London: Facet Publishing.

Worcester City Council. 2016. "Capitalising on Pokemon Craze Will Entice Visitors to Historic Worcester." *Worcester City Council*, January 9. Accessed 2017. http://www.worcester.gov.uk/ news-alerts/-/blogs/capitalising-on-pokemon-craze-will-entice-visitors-to-historic-worcester

Paper II

Hybrids and Heritage Resources: Rethinking the social foundation of the Historic Environment

Abstract

Conceptually, the historic environment is considered a valuable resource for heritage expression and exploration. The databases and records that house historic environment data are venerated and frequented entities for archaeologists, but arguably less so for non-specialist users. In inventorying the historic environment, they fulfil a major role in the planning process and asset management that is often considered to be more than just perfunctory. However, despite the temporal and spatial breadth and depth of their contents, it is arguable that they underperform when it comes to engaging with and expressing heritage values. Furthermore, theoretical discussions into the nature and performative role of the historic environments within society are notably sparse. By reconsidering the concept of the historic environment, the aim is to better understand how heritage is expressed by examining the networks within which the cultural performances of the historic environment take place. The goal is to move beyond a purely material expression and seek the expansion of the cultural dimension of the historic environment.

Keywords: historic environment, actor network theory, heritage stewardship, digitality, placemaking

1. Introduction

Heritage and archaeology oft go hand in hand, and perhaps, as it has become primarily the remit of archaeologists, it ought to be no surprise that the historic environment, as a material facet of our surroundings, is determined broadly in the same manner. Largely governed by inventories and databases, the concept of the historic environment enables the landscape to be viewed as an historic artefact in its own right. In the USA this is often falls under the umbrella of cultural resource management; in England these

operations are carried out by historic environment records (HERs); or alternatively, many countries opt for a national database (McKeague, Corns, and Posluschny 2017; Richards et al. 2021). Their expression, via spatial data and GIS software linked to database contents, is the common ground, with much of the surrounding policy and practice varying heavily from country to country based on individual national and state interests.

Clearly this is only one form of access to the historic environment, but one which functions within a wider network of protective and preventative measures in terms of land usage. Listing, scheduling, registers, local heritage designations are just some of the apparatuses of policy that inform and draw upon the historic environment and its records. It is also generally apparent that the goal, in the main, is to translate the physical historic environment into a framework where it can be collected, collated, and packaged for defining and transmitting information about the physical traces of the past and inventorying it as either an asset to be protected, or as a record for perpetuity. In essence, the founding philosophy was the creation a descriptive record as point of departure for the qualitative evaluations that more tendentiously draw other types of information and contexts into play, whether planning, political or research lead.

Timothy Darvill (2009) relates the historic environment to "All the physical evidence for past human activity, and its associations, that people can see, feel, find, and understand in the present world", which implies it belongs well within the realm of archaeology. Furthermore, in terms of heritage, a later clause in his definition highlights the explicit government (UK) usage of the term historic environment in *preference* to the term heritage. However, inasmuch as there is undoubtedly an archaeological heritage in relation to the landscape, it is not one necessarily commensurate with a wider definition of heritage as a whole (Waterton and Smith 2009, 24). Instead,

approaching heritage as a set of current attitudes and values "formed as a result of the relationships between people and other human and non-human actors", relating to "objects, places and practices" (Harrison 2013b, 14), it becomes clear that the two are not necessarily interchangeable synonyms.

If the historic environment was a purely material consideration, then this would be unproblematic. But in terms of realizing what the historic environment is, it could be argued that the material aspect is only one portion of the concept. This has particularly implication when considering the historic environment, and its associated inventories, as heritage resources. These databases are arguably a frontispiece for what Cornelius Holtorf identifies as the preservation paradigm in archaeology (Holtorf 2014). The societal desire to retain traces of its existence for posterity, in regards to future well-being is well meaning, but in order to avoid a "shift from stewardship to self-gratification" (Lowenthal 2006, 21) more must be done for contemporary enrichment of our own essential natures. Thus, while the land use planning system is "agonizing" over which bits of the past to keep, record, preserve or restore, it fails to recognize the connection made between the past and the lived present. The material presence of the past is only one part of the picture, and as Holtorf argues, "the story heritage can tell us is not damaged or diminished but actually enriched when something is added, modified, or taken away" (Holtorf 2014, 6128). In the planning system however, the value of the past is "reduced to the literal act of preserving its fabric" (Fairclough 2009, 158) rather than actively engaging in the socio-politics of what that past means to the communities of the present.

If, as King states (2010, 104), "the historic environment is everything that has influenced, or that reflects, our cultures and those of our progenitors, which empower the value of the historic environment as a heritage resource" then the networks that

empower require reappraising. The goal of this paper is then primarily this; to visualize the networks and agency within the mechanisms employed in socializing the historic environment record (HER), assessing how heritage is determined and valorized through inventories as primary points of access to heritage.

2. Stewardship and Authorized Heritage Discourse

The establishment of protection for monuments throughout the nineteenth and twentieth centuries at varying points globally, distinguishing policy and practice from antiquarianism (Morel 2019, 2) was significant. Through this recognition in policy, many of the databases and inventories that characterize the contemporary stewardship of the historic environment arose. Local authorities, or previously heritage boards, create agendas as to what is recorded, largely favoring attribute-based criteria, tending towards archaeological data. Principally this adds rigor and consistency, but establishes the specialist's role interpreting what does or does not belong in the inventory, which by and large omits local knowledge and cultural association with the site or monument (McKeague, Corns, and Posluschny 2017).

Superficially, this recollects the familiar tenets of Laurajane Smith's Authorized Heritage Discourse (AHD) (2006, 29), lending primacy to "aesthetically pleasing material objects, sites, places and/or landscapes that current generations 'must' care for, protect and revere". Whilst it has been long acknowledged that 'historic environment', 'cultural resource' and 'heritage' are rather general terminologies (Baker 1977, 1), that archaeological assets and markers of land uses ought to be automatically considered as heritage, and safeguarded as such, should be contended. Stewardship of data is necessary for the improvement of decision-making processes, but is less regularly

discussed in terms of responsibility and equity (Wright and Richards 2018, 560-1) particularly in terms of heritage making phenomena, which is implicitly a consequential aspect of the performance of inventorization.

Early assessment of survey programs and systems of recording (Baker 1977, 1-3) offered broad and inclusive uses of the historic environment, employing the overlapping themes of perception, utilization and transmission of heritage. Thus, there remains a common defiance in light of the accusatory gaze of AHD, exemplified for example by Martin Newman (2009), whereby the positive efforts of historic environment stewardship are considered to have offset these criticisms, having somewhat successfully taken up the utility of electronic dissemination, online interaction and aggregation. Through these mechanisms, the reflexivity and apparent openness of the inventorying process counter the notion that archaeology is fundamentally a part of AHD. Given the performative aspect of the HER takes place within a system of checks and balances constrained by the public sector as a means of negotiating public interest in land use development, to an extent is indeed indicative of democratic principles.

While it is not necessarily more meritorious to focus on the public facing aspects of the inventory process, it is often upheld that these systems are maintained in the public interest. Indeed the adoption of the term 'historic environment' itself was a process of attempting to render heritage in a more objective, and therefore inclusive, fashion (Waterton 2010, 5). However, while the system appears to be one of democratic equipoise regarding public interest and development, this does not necessarily equate to accountability, transparency, and egalitarian access. There is little means of enforcing the benchmarks highlighted by *A Guide to Historic Environment Records (HERs) in England* (Tait and Wallace 2019, 3) across the board, and many 'big concepts' in recent

heritage theory, exemplified by identity, authenticity, or dissonance (Waterton and Watson, 2013, 456) have seemingly done little to permeate the everyday institutional practices that shape the inventorisation of the historic environment. Resultant asymmetrical biases in general content, literature and policies therefore pose the question of who it is that these inventories best serve.

3. Ontological Perspectives

As a point of departure, the structure of the systems persevering and reproducing the historic environment require examination, and as such this paper aims to magnify current ontological perspectives on HERs. As Derrida states (1998, 17) "the technical structure of the *archiving* archive also determines the structure of the *archivable* content even in its very coming into existence and in its relationship to the future". In this context archives often operate with a limited field of vision that can be broadly summarized as the use and reuse of archaeological data. An optimistic view would be that by drawing sites and monuments together, these inventories function as the 'oligotpica' of Latour's thinking (2005, 181); in essence, the spaces where consensus and knowledge are born. However, in characterizing the landscape as organizational assets of value, they operate in contrast, organized panoptically as "spatial unities that make it possible to see constantly and to recognize immediately" (Foucault 1995, 200).

Records, however conscientiously kept are frequently imperfect, yet through imperfection are able to become a narrative source of cultural value in itself, thus, "producing as much material as it records" (Derrida 1998, 17). Here, the historic environment is regularly envisaged in reduced form for ease of management and dissemination. Data and information can be seen as unambiguous and inert, as open ended resources to be used by anyone, where as it is seen as "more rewarding to

understand records as representations"(Yeo 2018, 129). A piece of information may be recognized as a proposition, or way of asserting a view of the world, but rarely has it the capacity to show more than one perspective. Problematic in terms of alternative archaeologies. The goals of a minority of specialists "without adequate responsibility" (Dawson 2019, 6) attempting to record the historic environment as a non-redundant and unbiased source of information essentially creates a closed system.

Crucially, a record cannot be outside of the historic environment and seek to define it. As common spaces for an indistinct body politic, largely comprising of archaeological professionals, the mechanisms of inventorying are themselves contra-environments, subject to the wider network of a historic environment as a whole. In order to explicate this conceptually, this paper turns to Latour's actor-network-theory (ANT hereafter) (2005), hosting the principle that humans and objects act and co-act within their extended networks. As an ontological intervention ANT is a means of creating the conditions through which the world to knowledge creation is viewed. This process of revealing entails this entails not how one sees things, but what there is to see in the first place (Holbraad and Pedersen 2017, 5). If the network can be explored and understood, then rather than focusing solely on the material components, the performative practicalities of reaching a broader public audience can be redressed.

4. Expanding the principles of ANT

Where other forms of sociology are primarily concerned with the 'whys', actor-network material semiotics explores the 'hows' of social networks function, (Law 2009, 148). To apply ANT is "to interrogate the relationships within networks simply by providing the who and the where" (Roberts and Sheppard 2020, 4) allowing the focus to move away from actants as individuals, rendering them visible as a whole network

without hindering their movement or introducing personal politics. As well as laying bare the functions of the historic environment as a social entity, by exploring of the social composition of the inventory processes, the network limitations of equitable and egalitarian usability across the span of its social structure will be demonstrated.

In exploring the principles of ANT, it is prudent to explore Latour's lexicon – in particular the term 'hybrid'. Originally, it was used to designate objects or beings "as hybrids of both culture and nature" (Latour 1993, 10) in order to deny the 'Modern' distinction of attempting to "slice the world cleanly into two purified districts" (Harman 2009, 63). However, the term itself is considered somewhat problematic, so much so that Latour himself has moved away from its usage (Latour 2013b, 561). Of similar connotation, the term quasi-object is also often used to avoid what Harman describes as the "false overtones of a mixture of two pristine ingredients" as indicated by the term 'hybrid'. The 'quasi-' aspect is considered even more misleading, as it portrays a far more ephemeral subject. Instead, in the ontology of Latour and Harman, there are only actants (Harman 2009, 63). Nevertheless, to highlight both the ontologically elevated status of objects of human and non-human nature, and the 'contamination' between the original objects and their subsequent interpretation/ collation, the term 'hybrid' will be used here.

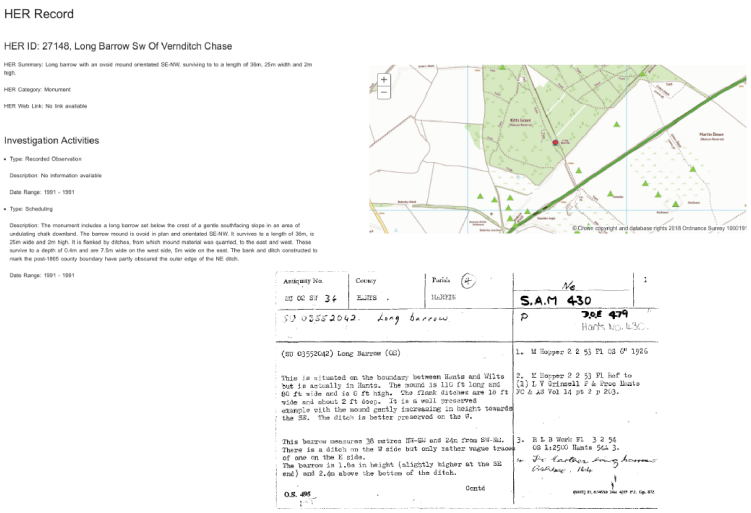
As with other well established heritage fields, such as anthropology and museum studies (Bennett et al. 2017; Harrison, Byrne, and Clarke 2013), archaeology has been no stranger to Latour's principles, during what has been described as a paradigm shift away from a humanist hegemony towards a post-humanist, object-centered approach to agency characterized as the material turn (Gosden 2005; Olsen 2012, 20). This turn towards conceptualizing non-humans, things and objects as part of the heterogeneous assemblages described by Latour (2005, 1993) has become increasingly commonplace

in archaeological discourse (Harrison 2013b, 37-9; Olsen 2010; Pétursdóttir 2012; Webmoor and Witmore 2008; Witmore 2007). However, despite its broad focus, the historic environment as an entity has yet to be appreciated in the same manner. Nor have the locations, in this case the inventories, where it is drawn together. Instead what occurs is the blackboxing of the historic environment; its social processes rendered invisible by its own successes (Latour 1999, 304).

Few have made effort to open the box. Newman (2011) lifts the lid when comparing digital databases to their analogue predecessors, identifying the material terms of historic environment records. It is difficult to disagree with his conclusion that these databases, in any format, represent historic documents. One could go even further in suggesting that the databases are in fact monumental. After all, they have their own historiographies, formed by long lasting experiential associations with the professional archaeological sector for several decades. However, contemporary discussion is often limited to their functionality and perception without ever articulating the social foundation of the historic environment and its transmitters. Despite some acknowledgment of the materiality of databases, the objects within them, what they are and how they are represented, remain locked away.

Accessibility, usually regarding delivery in terms of data re-use or research, is of regular concern. This does not necessarily mean that all the aspects are accessible to a wider public, however. Nor does it mean that any in-depth studies of usefulness to non-specialists have taken place. Where they have, the focus has been on land development for example in Sweden and Finland, or on the enrichment of spatial content, such as in Santiago de Compostela in Spain as well as in Sardinia and Rome (McKeague et al. 2020, 21). This of course relates to the core principles of the inventory, in essence the very purpose of maintaining a record.

This is very definitely true for the Sites and Monuments Record (SMR), the predecessor of the HER. However, as Paul Gilman highlighted in reviewing the consolidation of the SMR within the then newly formed HER, access and education are key. He argues "two-way flow of information between SMRs and local people with an interest in learning more about, and recording, their local historic environment" (Gilman 2004). However, if bidirectional access is truly visible; if the social influences and biases are to be sought and recognized, as Latour encourages, it must be done "*before* the box closes and goes black" (1987, 21).


HER Record

HER ID: 27148, Long Barrow Sw Of Verndith Chase

HER Summary: Long barrow with an ovoid mound orientated SE-NW, surviving to to a length of 39m, 25m width and 2m high.

HER Category: Monument

HER Web Link: No link available

Investigation Activities

- Type: Recorded Observation

Description: No information available

Date Range: 1991 - 1991

- Type: Scheduling

Description: The monument includes a long barrow set below the crest of a gentle southfacing slope in an area of undulating chalk downland. The barrow mound is ovoid in plan and orientated SE-NW. It survives to a length of 39m, a 25m wide and 2m high. It is flanked by ditches, from which mound material was quarried, to the east and west. These survive to a depth of 0.4m and are 7.5m wide on the west side, 5m wide on the east. The bank and ditch constructed to mark the post-1865 county boundary have partly obscured the outer edge of the NE ditch.

Date Range: 1991 - 1991

© Crown copyright and database rights 2018 Ordnance Survey 100019

Antiquity No. SU 03 SW 34 | County HANTS | Parish (A) | No. S.A.M 430

SU 03552042. Long barrow.

(SU 03552042) Long Barrow (GI)

This is situated on the boundary between Hants and Wilts but is actually in Hants. The mound is 110 ft long and 86 ft wide and is 6 ft high. The ditches are 18 ft wide and about 2 ft deep. It is a well preserved example with the mound gently increasing in height towards the SE. The ditch is better preserved on the W.

This barrow measures 36 metres EW-SW and 24m from SW-NE. There is a ditch on the W side but only rather vague traces of one on the E side. The barrow is 1.8m in height (slightly higher at the SE end) and 2.4m above the bottom of the ditch.

Comtd

O.S. 49

1. M Hoppar 2 2 53 Pl OS 6" 1926

2. M Hoppar 2 2 53 Pl Ref to (1) I F Grimsell F A Prog Hants FC & AS Vol 14 pt 2 p 203.

3. R L B Work Pl 3 2 54 OS 1:2500 Hants SEa 3.

Figure 1a: An example of a contemporary historic environment record entry, including the Ordnance Survey Antiquity card, reproduced as supporting content and published with kind permission from Ordnance Survey (Hampshire County Council, 2009)

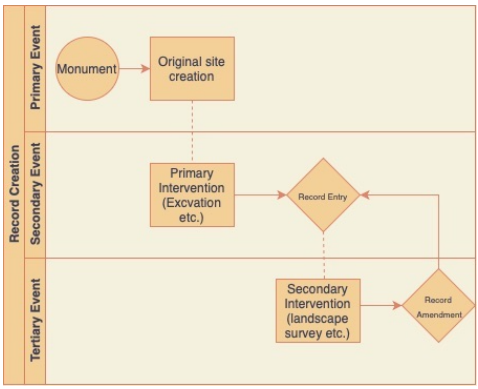


Figure 1b: Simplified flow diagram of historic environment record creation

5. Hybridity in the Historic Environment

As the historic is "extended to include not only the ancient but the only recently passed" (Harrison and Schofield 2010, 235), it may seem self-evident that the purpose of such databases is to inventory the physical evidence within the cultural landscape within that span. As well as the monument itself, it is common to record events, often characterized as interventions, observations, or investigations, such as contemporary archaeological fieldwork. An event is thus said to entail:

> a single episode of primary data collection over a discrete area of land. This single recording event can only consist of one investigative technique and is therefore a unique entity in time and space. (Catney 1997, 3)

In this sense, it is reminiscent of Geoffrey Yeo's (2018, 130) occurrent terminology - phenomena that are perceived to have an ending in time, rendering them inert and persistent spaces within the inventory. Clearly, events do not take place without the limit of time, however there are events regarding land use that become difficult to

ascertain finite points of commencement and conclusion, such as occupation. One issue that arises here relates to persistent usage, especially less formal usage, and quotidian interactions: for instance, dog walking. While this is clearly non-archaeological in spatial and event terms, in a public sense, these activities frequently account for the majority of non-specialist (public, or non- heritage related professional users) interactions with monuments. Instead, contemporary activity is largely accounted for by the activity of specialists.

Perhaps the result of the routinization of their performance, it is often overlooked what these entries are on a theoretical level. It is generally understood that they are digital translations of the analogue systems of the twentieth century, such as the Ordnance Survey card system (Phillips 1959). These paper records were often copied verbatim into digital format or where budgets have permitted, translated via optical character recognition. In this format, entries are augmented by regulated glossaries such as those utilized in Britain (Forum on Information Standards in Heritage 2020), France (Consortium MASA 2020) and the Flanders region (Vlaanderen Onroerend Erfgoed 2017). This metadata not only standardizes, but further speeds up the process of reaching an object's identity and description. The inventory format permits this process of translation, as well as a process of reproduction, holding facsimiles of the cards themselves, alongside photographic images, taken on location and reproduced as part of the database entry's digital supplement. But what is less overt is their status as highly creative and social products, both then and now, of an archaeological system of literary inscription (Latour and Woolgar 1986). These translations are themselves the translated form of the original source material used to feed the record. They are the abbreviated, core details from site reports, publications and archaeological literature of all forms

translated into short form for the purpose of bringing the perceived key aspects directly to the destination, the reader.

Both the purpose and the effect are the further removal of an object from its context and, in doing so, they create a new object in the form of the database entry and its associated reproductions. It is removed from "superimposed structures, artefacts and debris mixed together, different pasts and different dates" (Olsen 2012, 25-6). Plucked from the site report, it manifests itself in the database as part of a "compatible, standardized and ocular-centric" dataset (Witmore 2007, 248), epistemologically moving towards the recorded format, and away from the lived and felt experience. What is created instead is a hybrid - the object; the excavating archaeologist; the report writer and the archivist all revealing themselves together in the database as a new ontological actant. The creation is a process of mediation, translated via various steps, agents and their intentions and goals until it has reached a new goal and digital state of being. In lieu, a digital object embodies the real object and its observers, taken out of context and time in a liminal state of existence within the database. In reifying these objects, the process at which they came to be brought into existence is removed. All intermediary steps are forgotten, the entry is inscribed with values from wider archaeological operations, routinized, rendered non-controversial (Latour and Woolgar 1986, 63) and crucially for future processes, readily synthesizable.

These hybrids have somewhat strange existence, as dually authentic and inauthentic, as both facsimiles and new reproductions of the original physical object at the same time. In the creation of a database entry, there is no inherent value or quality in the original until it is excavated and handled by the relevant expert or professional. Their enrolment and incorporation into a corpus (Latour and Woolgar 1986, 106) with as broad a frame of reference as the archaeological discipline, lends weight to the

entry's validity and factuality. This is often further reinforced by addition of references to the original report, grey literature, photographs, or site plans. In many cases, these entries are the product of numerous excavations or processes of work, becoming palimpsests of the work of numerous practitioners, in both the field and behind the desk, further garnering validity, reliability and authenticity. Yet at the same time, this is not an archaeological object, but a digital representation (metadata, reproduction, and all). Surely then, they are little more than placeholders for the original objects or features? They are far removed from the network the originals were recovered from, nor does its production bears resemblance to that of the original form. The gap between the object and the entry is enormous and fundamentally impassable, removing the element of the physical and replacing it with the digital. No aura of authenticity could possibly be migrated!

Digital acquiring and negotiation of authenticity is a complex process. Walter Benjamin's response to the mechanical reproduction of art in the 1930s, a period that saw a rise in the technological developments in filmmaking and photography, is a starting point of sorts. To Benjamin (2015, 214), "even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be". In essence, age and the fabric of time and history are key. In the historic environment, the emphasis is placed on the material substance as "it is it is this material substance, after all, that was constructed or made in the past" (Holtorf 2013, 430). But, contrary to Benjamin, Latour and Lowe (2011) establish that context, effort and sophistication can determine a migration of the aura of authenticity. Furthermore, the evidence presented by the ACCORD Project, would also suggest that co-production and community heritage production can also distil a sense of authenticity (Jones et al. 2017). And yet so deeply entangled within institutional and

authorized heritage structures, despite the relatively low effort and cost to producing entries, as well as the severe lack of sophistication in sensory terms, the manifestations of the historic environment invested digitally within databases still hold sway.

While digital may imply virtual to many (Latour and Lowe 2011, 287), there is nothing especially virtual about these entries. Instead, the speed and ease at which these hybrids can be inscribed and re-inscribed; enrolled and re-enrolled, moves the subject closer towards immutability without straying from its inherent mutability. A case in point would be those entries whereby the original object has been lost, the original literature is unavailable or of poor quality, or even those enrolled by word of mouth – objects that are only known in their hybrid form. Their presence in a database grant it the benefit of the doubt, enrolling the trusted position of an established public institution to its claim for existence when vying for spot in the narrative. As things, entries possess agency, their praxis formulates human action in a tangible and supposedly meaningful way. This does not necessarily confirm the notion that these entries are constitutive of heritage, but neither does it undermine it. Yet, they are end in themselves, but instead gateways, highlighting the path to the understanding of a landscape or urban area. This should function for either professionals, academics, or community usage. That it does not warrants critical analysis.

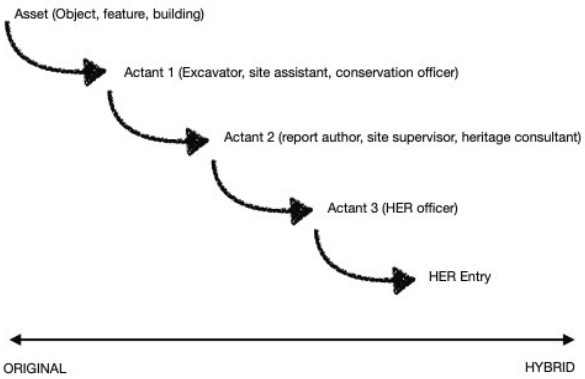


Figure 2: Hybridization process, from object to entry

6. Human hegemony, or actor-network?

Despite regularly intervening in human processes, the role of these hybrid entities is often overlooked. As they are currently envisioned, these databases epitomize a foil of Latour's, "double-click" intellection – seemingly "free, indisputable, and immediate access to pure, untransformed information" (2013a, 93). Point by point, period by period, they appear to slavishly serve human whim. In this model, these databases are curated and made available democratically for people to browse at will. The only social complexities are on Bourdieusian terms (Dolwick 2009, 30), through which a combination of one or all of one's symbolic, cultural, economic and social capital impacts the access to heritage.

The curious non-specialist can access the database freely, their only inhibitions may be technical jargon or issues with context, at which point the curatorial entity is on hand to fulfil an outreach role. Students and academics likewise regularly have free access to data (though not always). Finally, there are the professional users, those with

economic imperatives for retrieving historic environment data as part of the land use planning sytem, and the financial capital to back it up. These are the individuals and entities associated with development and planning who are regularly charged for accessing data. Regardless of cultural capital, the archival format is a resource that functions as its human consumer dictates.

An element of public cognitive ownership (Carman 2009, 204-5) is often associated with archaeological sites. Yet, as extensions of the monuments or buildings they represent, rarely do the contents of such records hold the same symbolic sense of place and community. While there is potential analytic value to the academic, enabling the scrutiny and evaluation of a landscape by monument or object type or by time period, the customary user represents a professional community whose commercial practice is endorsed by gazetteers of the known historic landscape and negotiation with the planning authority and curatorial archaeologist. In England, austerity measures and local government cuts have led to these commercial users becoming the benefactors in kind, propping up local databases by paying access charges for data. Significantly, commercial archaeology (and academic archaeology to an extent) is also a data producer, influencing the addition of new entries or augmenting previous entries. Whilst this can be described as part of a recursive archaeological process of continual flow and circulation by Ian Hodder (1999, 99), it still relies on the agency of human actants, defining the historic environment as an intermediate resource; assets of latent heritage value, merely waiting to be identified, categorized and distributed.

This ontology of visualizing the management and functionality of the historic environment is not especially useful for understanding the mechanisms of heritage making in this context. It is only when understanding the social aggregates behind such repositories, the process by which data is mediated and enrolled becomes better

understood, but also critique of these networks as a means of heritage production becomes possible. As an aspect of the land use planning system, the sum of the performative process of accessing the HER is most frequently explored, i.e., its role as the evidence base for planning decisions, binding itself to the processes and products of impact assessment, evaluation, and negotiation. The draws on the weight of the HER assemblage, balanced against the demands of the planning system and the interests of a specific LPA. While this too has ground for critique, for example the lack of paradata engendering transparency and accountability, or the top-down perspective of determining value and policy; here, the focus is instead upon the fractal, and the ways which small groups and individual records mediate heritage information.

If "the object is either nothing but a screen on which to project human free will… or so powerful that it causally determines what humans think and do" (Latour 2004, 241), it is crucial to retain awareness of the role of non-humans within the network. The effect this has on human perception of an entry must be considered. In these networks, a culmination of a number of translations through a number of formats are witnessed, from the object, feature, or building in a physical format, through literature into current digital format (Westin 2012, 3). This not only alters object perception, but object interaction too. An entry is no more the physical object it represents than the map it is superimposed upon represents the landscape. Nor it is attached to the same networks its physical being commanded. It is merely an asset's representation in a digital format, yet within this network, it is this format that mediates our interaction.

Clearly, this depends on the object being represented. For example, megaliths, monuments, and historic buildings have a visual presence and do not rely on the same level of translation to be enrolled in public knowledge. Yet there are those features not

on display in museums, or visible in the landscape; those that were realized during excavation and are now backfilled below solar farms, housing developments or industrial estates. A reasonably large proportion of the historic environment consists of these features, and it is only through their mediation as database entries or as grey literature that they form part of the contemporary consciousness of the population. It is also, therefore, in this format that they can act as mediators affecting the outcomes of human decisions.

These entries are not, by themselves, social entities (Latour 2005). Whilst the network is inactive, these objects are dormant intermediaries. Yet when they are enrolled by another actant, they become mediators in their own right, dictating the human response within their network. If there are objects that can only be manipulated or interacted with in this format, or indeed only exist in this format, then this indicates that the historic environment is more than the physical sum of the cultural landscape, opening up the inclusion of greater intangibility in its definition. However, it also raises issues about non-discriminatory heritage agendas. By including such objects, whose physical counterparts may not have been recognized by human actants for decades, centuries, or even millennia, and by enrolling them in decision making processes, it would indicate that the arbitrators and administrators of these databases are able to dictate the value in objects on behalf of the networks they belong in. But, through the activation of the network, there are important processes that become hidden. Who defines what is historically/ archaeologically important, and how are they accountable? How and where is it adopted, and by whom? What is the policy for justifying record creation; is it exclusively determined by specialists or is community input feasible? Once entries are garnered as facts, how immutable is the fact? The blackboxing of this

information is troublesome if and when historic environment information is counterweighed against accusations of AHD on the basis of accessibility.

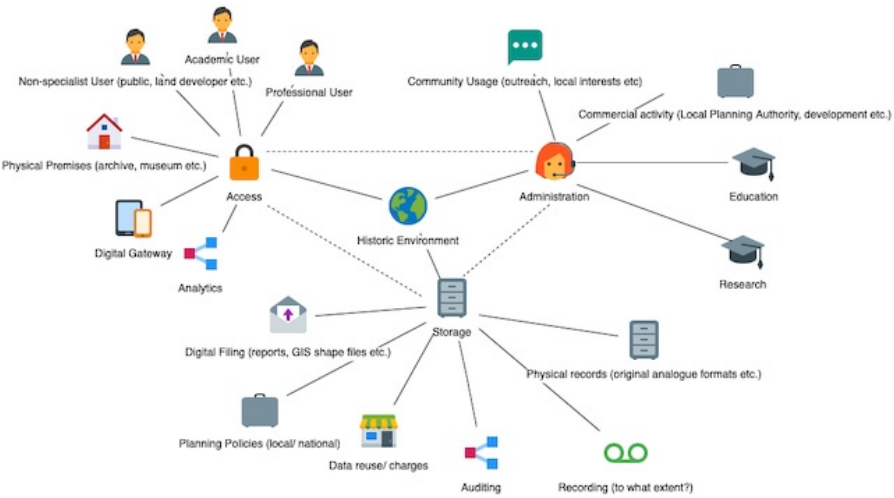


Figure 3: A simple visualization of the historic environment network as established through database management

To visualize a flatter ontology, the same circumstances, and the same categorization of actant, academic, professional, and non-specialist, must be considered. In their current format, entries are all but indisputable due to their reified and commoditized status within the inventory (Byrne 2008, 159-60), which is regularly the result of being situated in a position of trust. Importantly, they are also highly combinable and superimposable (Latour 1986). Through the metadata they are digitally imbued with, entries can be grouped spatially using GIS software by period, object type, find type, material et cetera. Academics, at least in advance of fieldwork, and professionals enroll this data in similar ways as a form of preliminary research into the landscapes' past prior to intervention. This is best exemplified by gazetteer production stimulated by commercial activity. Lacunae in the records need not tally with the

historic environment. Through association with known records, these gazetteers are what enable a plot of land with no known archaeological remains to retain legitimate archaeological interest (Hinton 2013, 14). As a requirement of the planning process, determining the impact of development on the historic environment, it is the combination of entries that are assessed by archaeological or historic building consultants in submitting planning applications for approval. The proposals for mitigation are in turn received by the curatorial archaeologist who determines an acceptable course of action.

Now consider the network without the combination of sites presented by the gazetteer; where would the information to allow for heritage mitigation and intervention come from? While the standing of heritage related professions in legislation and society has improved, the development would likely continue without archaeological intervention as in the past, for example prior to effective legislation, such as the introduction of PPG 16 in England (Department for Communities and Local Government 1990) and the aforementioned *Kulturmiljölag* and *Kulturminneloven*. At best less-targeted excavation is the outcome. For sites, monuments, or historic buildings with high visibility in the landscape, this is less problematic, but for the great many in situ assets there is no agency to provoke human response. In these situations, it is the database entries that stimulate an archaeological response and not the archaeology itself. As an actor-network, the archaeological objects and historic landscape features are intermediaries prior to their investigation. It is their representations within the database that mediate further discovery.

After the unearthing of archaeology and its subsequent processing or the undertaking of fieldwork, it has become a matter of course that the findings are processed as grey literature and then deposited or used to inform and update the current

database entries. The process begins with the planning application, following the data from the database through to the fieldwork and back into the database as a newly enhanced entry with dissemination and user feedback as a recursive loop. This demonstrates the bidirectional role of both the entries and the users as mediators, affecting each other's action and content. Crucially in network terms, the archaeology/ historical feature itself is unrepresented; it cannot mediate without the actants in its network. In Latourian terms, the recursive functionality is not necessarily a required characteristic of a network, however in this particular network this is the format in which feedback enables optimum network performance.

Whilst that functions extremely well in specialist contexts, where in that loop does the non-specialist user fit? It is true that the historic environment sector has taken care to make information available for the non-professional/ non-academic consumer. There is little social emphasis on the user who has a casual interest in their local area's archaeology or history. In fact, the network itself no longer functions in a reflexive manner when the user returns no feedback. There are exceptions, through community archaeology projects or even the work of amateur metal detectorists, who do have a feedback mechanism over varying degrees of directness. For example, through the UK via the Portable Antiquities Schemes, which is made available to local historic environment records on a regular basis, or the impact of projects such as the Zuni program cultural resource management in the United States (Marshall 2002, 214-5). While community archaeology programs are about far more than cultural resource management or heritage management, such projects are regular contributors to database content, though frequently mediated through a professional archaeologist, who becomes the voice for the amateur within the feedback mechanism. The casual reader remains an intermediary, however, rendered invisible as the weakest link in the network with no

way to socially reconnect to the rest of the network. The network no longer holds bidirectionality but acts in linear fashion from source to destination.

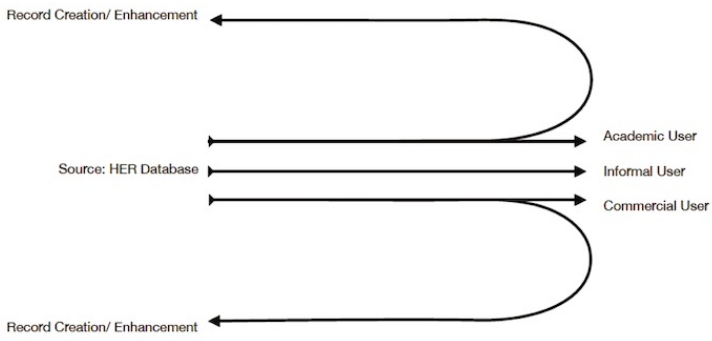


Figure 4: Performative feedback in the historic environment network

Despite the variations in mediators, rather than a resource that exists purely to be manipulated by human will, for efficient function these databases require symmetry between both hybrid actant and human actant in their performative routines. This is not to say that both actants are of equal standing. How could they be? After all, the database is designed and maintained by humans; the entries and much of their source material (though not necessarily all) is the work of human hands; and the gazetteer process is initiated by humans for the purpose of human cultural practices. However, as indicated, these procedures do not function in a satisfactory or culturally viable manner without the hybrid actants in this network. Likewise, the capital of the human actant also impacts the functionality of the network. Without both data circulation and collection, the network is abruptly terminated.

7. Heritage Implications: reinforcing AHD?

Despite the arguments for egalitarian accessibility, the hybrid objects that are created in producing recording the historic environment in this manner are arguably placed further away from the public. The tendentious assumption that anything relating to the historic element of the historic environment is synonymous with heritage. However, returning to Harrison's earlier cited exploration of heritage (2013b, 14), the relationship element is crucial. Relationships, conceptionally, are more complex than simple associations. Meaningful associations have an interactive value and character in and of themselves – thus "relationship is the cumulative experience of interacting" (Saunders 2005, 60). In this context however, this value and character is restricted by the limited ability for expression in a negative power dynamic, and dominance of authorized entities in the performance of the network.

The relationship between place and identity is a key association in the dynamic between heritage and the historic environment. Monuments, buildings and places in the landscape are inscribed with memories, and are consequently valorized as heritage assets through memorialization and commemoration (Ashworth, Graham, and Tunbridge 2007, 56). The issue with the organizing the historic environment via geo-spatial datasets is the in de-centralization of looking, not through our own perspective of our own interests but through the perspective of stewardship. The digital space interspersed with data points of predetermined value is no longer an anthropological place, but a non-place as Marc Augé describes (2008), no longer organized by its inhabitants but by access to its contents. The emphasis upon relating those contents to a meaningful, lived experience is then placed elsewhere, beyond the responsibility of the steward.

Although there are invariably multiple publics, be it on a global, national, or local scale, access to the historic environment on archival terms privileges a singular commoditized archaeo-historic view. The notions of visuality (Watson 2009) and experience (Harrison 2013a) are also closely linked. But in a geospatially determined view of the historic environment, the visibility and the associated social depth of a monument or site is poorly qualified in the present. As the REFIT project details (Tully et al. 2019), even at high profile archaeological monuments such as Iron Age *oppida,* there are variety of complex and interweaving activities taking place beyond those of an archaeo-historical nature. A conclusion of the project was that archaeological sites such as these cannot be managed as monuments based on their historic elements alone, and that as a resource for the management process, monuments should not be recorded solely as such either. Greater focus on community, cultural and natural occurrents is required.

Considering this, the authorized heritage debate remains vicinal. Accessing these networks can be done freely, digitally and at speed, but it is arguable that this works against its usefulness as a 'popular' heritage tool. The database functions well scientifically because of its combinability. It is not the responsibility of the steward to produce data in a synthesized, narrative format. As with most disciplines, these databases are inscribed in their own vernacular; archaeological, architectural, and historic jargon are a requirement. To function as efficiently as possible, cognitive accessibility is sacrificed for speed and combinability. The entries are quite literally written using the "voice of authorized heritage" (Högberg 2012). As a trade-off, digital accessibility is widely enacted, but that this is now prioritized, rather than exploring the framing or integration of data from other sources within the historic environment sector could be seen to be reinforcing AHD.

8. Concluding Discussion

How to appreciate and experience the historic environment is problematic in this format. As hybrids composed of both the physical and interpretational, removed from space and time, these are not objects as one would traditionally consider. Relating them to the landscape is impossible; they were never in a landscape. Traditions, memories, myth, and narratives are deeply entangled with the human interaction with place. The lack of these cultural elements is apparent through the archaeological mechanisms that many historic environment inventories adhere to. The cognitive dissonance between the database entries, their 2D representation in GIS format and the real world is too great to effectively formulate a meaningful sense of heritage, the opportunities for lived experiences are minimal. As with the codification of language, in terms of the social functionality, the mechanism and format employed to aid the protective aspect of heritage stewardship are precisely what inhibits the public engagement aspect. Formulating the system to favor the planning process, restricts exploration of intangible heritage and how people interact with the landscape. The question of whether the products of the commercial archaeological process these historic environment inventories favor are useful is for another paper, though questions over how much investigation into the human past is circumscribed into the process, or whether it merely represents a "routinized set of procedures", have previously been raised (Cumberpatch and Roberts 2012, 26).

It is crucial to ask 'whose sense of place'(Waterton 2005) does this system protect and nurture? Despite the latent potential for social cohesion and placemaking in the historic environment, the premise of preserved for ambiguous future communities takes primacy over engaging or understanding the heritage of the public communities that currently occupy the cultural landscape. The binary dichotomies of domination and resistance may not be in effect, but there is instead a system that is principally

concerned with maintenance and loss aversion instead of an actively egalitarian process for the majority. In terms of providing solutions however, “recognition is one thing; delivery is quite another” (Belford 2011, 51)

Where publicly funded, an institutions duty of care extends beyond the heritage consultants, architects, and commercial archaeologists. This is not to suggest that the discipline succumbs to epistemic populism, or as Alfredo González-Ruibal, Pablo Alonso González, and Felipe Criado-Boado (2018, 509) summarize it: “What the People say is correct because it is they who say it”. Equally, there are more serious claims that bear closer resemblance to reality (ironically, the more valid, the less anecdotally suitable) that ought to be critically scrutinized in the same manner that all forms of heritage making is scrutinized, as Rodney Harrison argues (2018). What is needed is greater mediation between the heritage preserved by inventories and the heritage of the communities and public that can legitimately claim some sense of ownership to the heritage assets recorded and maintained from their purse. Archaeologists “confidently study both the very earliest period of human history as well as the contemporary past” (Lucas 2010, 344) and this is rightly reflected in the material inclusivity of historic environment records. However, much of that is still defined by the tangible cultural landscape. A primary recommendation is to open the inventory to records of a more intangible, cultural nature. By expanding the nature of content, more favorable conditions for inclusion of lived heritage are created. Under these conditions and with a re-centered focus upon outreach, rather than simply expediating the planning process, a more experiential historic environment record becomes more feasible.

Evidence suggests that the need for community focused solutions has been realized in certain locales. The Know Your Place project in the west of England, which has become somewhat of an architype for a community turn within the historic

environment sector. Overt goals to enable local communities in Bristol to undertake their own local context analysis and for the co-production of knowledge by facilitating direct input from the public for validation to the local historic environment were made clear (City Design Group 2011, 2). Since its inauguration, the Layers of London and New Forest Knowledge projects have both launched their own interfaces with similar aspirations, focusing their content towards communicating history, memory, and sense of place to local inhabitants. Crucially, projects of this nature offer learning objectives, recruiting, and training volunteers and individuals to contribute their own experiences to the recorded historic environment. One such example is Outstories Bristol (2011), hosted as a platform by the local authority, but defined by the LGBT+ community enabling the bi-directional flow of historic environment data previously so difficult to obtain because of the lack of mediation processes.

As heritage is becoming increasingly mobile and open to interpretation, the historic environment sector can no longer focus simply on the ancient and aging. The rise of contemporary archaeology studies and counter-archaeologies (Schofield 2017) shows that memory is becoming an increasingly important aspect. Our experience of the past, in a meaningful, capacious, and communal sense depends on our knowledge of the past. But recollection in societal terms requires the input of the public alongside the institution. There is still room for but, as the historic environment itself broadens, the process of recording it must coevolve. Without this community turn, a critical reflection on the material obsession with landscape leaves historic environment sectors solely in the hands of the planning authorities and development industry.

References

Ashworth, Gregory John, Brian J. Graham, and J.E. Tunbridge. 2007. "Place, Identity and Heritage." In *Pluralising Pasts: Heritage, Identity and Place in Multicultural Societies*, edited by Gregory John Ashworth, Brian J. Graham and J.E. Tunbridge, 54-68. London: Pluto Press.
Augé, Marc. 2008. *Non-places: An introduction to Supermodernity*. London: New York: Verso.
Baker, David B. 1977. "Survey and the Historic Environment." In *Planning and the historic environment II*, edited by T Rowley and M Breakall, 1-23. Oxford: Oxford University Department for External Studies.
Belford, Paul. 2011. "Archaeology, Community, and Identity in an English New Town." *The Historic Environment: Policy & Practice* 2 (1):49-67. doi: 10.1179/175675011x12943261434602.
Benjamin, Walter. 2015. "The Work of Art in the Age of Mechanical Reproduction." In *Illuminations*, 211-44. London: Bodley Head.
Bennett, Tony, Fiona Cameron, Nélia Dias, Ben Dibley, Rodney Harrison, Ira Jacknis, and Conal McCarthy. 2017. *Collecting, Ordering, Governing: Anthropology, Museums, and Liberal Government*. Durham; London: Duke University Press.
Byrne, Denis. 2008. "Heritage As Social Action." In *The Cultural Heritage Reader*, edited by Graham Fairclough, Rodney Harrison, John Schofield and John H. Jameson Jnr, 149-73. Abingdon: Routlege.
Carman, John. 2009. "Where the Value Lies: The Importance of Materiality to the Immaterial Aspects of Heritage." In *Taking Archaeology Out of Heritage*, edited by Emma Waterton and Laurajane Smith, 192-208. Newcastle upon Tyne: Cambridge Scholars Publishing.
Catney, Steve. 2020. "So what is an event?" Royal Commission on the Historical Monuments of England, Accessed 23rd June. https://www.heritagegateway.org.uk/gateway/file/hg/content/upload/her_file_store/4882.pdf.
City Design Group. 2011. *Know Your Place: Learning and Sharing Information about Historic Bristol*. Bristol: Bristol City Council.
Consortium MASA. 2020. "Thésaurus PACTOLS pour l'archéologie." Accessed 12th August. https://masa.hypotheses.org/pactols.
Cumberpatch, Chris, and Howell M. Roberts. 2012. "Life in the Archaeological Marketplace." In *Archaeology in Society*, edited by Marcy Rockman and Joe Flatman, 23-44. New York: Springer.
Darvill, Timothy. 2009. "Historic Environment." In *The Concise Oxford Dictionary of Archaeology*, edited by Timothy Darvill. Oxford: Oxford University Press.
Dawson, Michael. 2019. "Introduction: Profession, discourse and agency." In *Heritage Under Pressure: Threats and Solutions*, edited by Michael Dawson, Edward James and Michael Nevell, 3-24. Oxford: Oxbow Books.
Department for Communities and Local Government. 1990. "Planning Policy Guidance 16: Archaeology and Planning." In. London: HMSO.
Derrida, Jacques. 1998. *Archive Fever: A Freudian impression*, *Relgion and Post-modernism*. Chicago & London: University of Chicago Press.
Dolwick, Jim S. 2009. "'The Social' and Beyond: Introducing Actor-Network Theory." *Journal of Maritime Archaeology* 4 (1):21-49. doi: 10.1007/s11457-009-9044-3.
Fairclough, Graham. 2009. "Conservation and the British." In *Defining Moments: Dramatic Archaeologies of the Twentieth-Century*, edited by John Schofield, 157-64. Oxford: BAR Publishing.

Forum on Information Standards in Heritage. 2020. "FISH Vocabularies." Accessed 12th August. http://www.heritage-standards.org.uk/FISH Vocabularies.
Foucault, Michel. 1995. *Discipline and Punish. The Birth of the Prison*. New York: Vintage.
Gilman, Paul. 2004. "Sites and Monuments Records and Historic Environment Records in England: is Cinderella finally going to the Ball?" *Internet Archaeology [online]* 15. doi: https://doi.org/10.11141/ia.15.3.
González-Ruibal, Alfredo, Pablo Alonso González, and Felipe Criado-Boado. 2018. "Against reactionary populism: towards a new public archaeology." *Antiquity* 92 (362):507-15. doi: 10.15184/aqy.2017.227.
Gosden, Chris. 2005. "What Do Objects Want?" *Journal of Archaeological Method and Theory* 12 (3):193-211. doi: 10.1007/s10816-005-6928-x.
Harman, Graham. 2009. *Prince of Networks: Bruno Latour and Metaphysics*, *Anamnesis*. Prahan: re.press.
Harrison, Rodney. 2013a. "Heritage." In *The Oxford Handbook of the Archaeology of the Contemporary World*, edited by Paul Graves-Brown, Rodney Harrison and Angela Piccini, 273-88. Oxford: Oxford University Press.
———. 2013b. *Heritage: Critical Approaches*. London/ New York: Routledge.
———. 2018. "Critical heritage studies beyond epistemic popularism." *Antiquity* 92 (365). doi: 10.15184/aqy.2018.223.
Harrison, Rodney, Sarah Byrne, and Anne Clarke. 2013. "Reassembling the Collection: Ethnographic Museums and Indigenous Agency." In *School for Advanced Research Advanced Seminar Series*, edited by James F. Brooks. Santa Fe: School for Advanced Research Press.
Harrison, Rodney, and John Schofield. 2010. *After Modernity: Archaeological Approaches to the Contemporary Pas*. Oxford: Oxford University Press.
Hinton, Peter. 2013. "The National Planning Policy Framework and Archaeology: A Response – How did the Profession come to this?" *Papers from the Institute of Archaeology* 22. doi: 10.5334/pia.392.
Hodder, Ian. 1999. *The Archaeological Process: An Introduction*. Oxford: Blackwell.
Högberg, Anders. 2012. "The Voice of the Authorized Heritage Discoure." *Current Swedish Archaeology* 20:131-67.
Holbraad, Martin, and Morten Axel Pedersen. 2017. "Introduction: The Ontological Turn in Anthropology." In *The Ontological Turn: An Anthropological Exposition*, edited by Martin Holbraad and Morten Axel Pedersen, 1-29. Cambridge: Cambridge University Press.
Holtorf, Cornelius. 2013. "On Pastness: A Reconsideration of Materiality in Archaeological Object Authenticity." *Anthropological Quarterly* 86 (2):427-43. doi: 10.1353/anq.2013.0026.
———. 2014. "Preservation Paradigm in Heritage Management." In *Encyclopedia of Global Archaeology*, edited by Claire Smith.
Jones, Siân, Stuart Jeffrey, Mhairi Maxwell, Alex Hale, and Cara Jones. 2017. "3D heritage visualisation and the negotiation of authenticity: the ACCORD project." *International Journal of Heritage Studies*:1-21. doi: 10.1080/13527258.2017.1378905.
King, Thomas F. 2010. "My Historic Environment." *The Historic Environment: Policy & Practice* 1 (1):103-4. doi: https://doi.org/10.1179/175675010x12662480108992.

Latour, Bruno. 1986. "Visualisation and Cognition: Drawing Things Together." In *Knowledge and Society Studies in the Sociology of Culture Past and Present*, edited by Henrika Kuklick, 1-40. Greenwich: JAI Press.
———. 1987. *Science in Action : How to follow scientists and engineers through society*. Cambridge: Harvard University Press.
———. 1993. *We Have Never Been Modern*. Translated by Catherine Porter. Cambridge: Harvard University Press.
———. 1999. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambrige; London: Harvard University Press.
———. 2004. "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern." *Critical Inquiry* 30 (2):225-48.
———. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
———. 2013a. *An Inquiry into Modes of Existence: An Anthropology of the Moderns*. Translated by Catherine Porter. Cambridge, Massachusets: Harvard University Press.
———. 2013b. "Is there an ANT at the beginning of ANThropology? A few responses to the subject matter of the collection." *Social Anthropology/ Anthropologie Sociale* 21:560-3. doi: 10.1111/1469-8676.12053.
Latour, Bruno, and Adam Lowe. 2011. "The migration of the aura, or how to explore the original through its fac similes." In *Switching Codes: Thinking Through Digital Technology in the Humanities and the Arts*, edited by Thomas Bartscherer and Roderick Coover, 275-97. Chicago; London: University of Chicago Press.
Latour, Bruno, and Steve Woolgar. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press.
Law, John. 2009. "Actor Network Theory and Material Semiotics." In *The New Blackwell Companion to Social Theory*, edited by Bryan S. Turner, 141-58. Chichester: Wiley-Blackwell.
Lowenthal, David. 2006. "Stewarding the future." *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography* 60 (1):15-23. doi: 10.1080/00291950500537299.
Lucas, Gavin. 2010. "Time and the archaeological archive." *Rethinking History* 14 (3):343-59. doi: 10.1080/13642529.2010.482789.
Marshall, Yvonne. 2002. "What is community archaeology?" *World Archaeology* 34 (2):211-9. doi: 10.1080/0043824022000007062.
McKeague, Peter, Anthony Corns, Åsa Larsson, Anne Moreau, Axel Posluschny, Koen Van Daele, and Tim Evans. 2020. "One Archaeology: A Manifesto for the Systematic and Effective Use of Mapped Data from Archaeological Fieldwork and Research." *Information* 11 (4). doi: 10.3390/info11040222.
McKeague, Peter, Anthony Corns, and Axel Posluschny. 2017. "Why the Historic Environment needs a Spatial Data Infrastructure." *Internet Archaeology [online]* 43. doi: https://doi.org/10.11141/ia.43.7.
Morel, Hana. 2019. "Policy and Practice of London's Historic Environment." *The Historic Environment: Policy & Practice*:1-26. doi: 10.1080/17567505.2019.1574098.
Newman, Martin. 2009. "Devil's Advocate or Alternate Reality? Keeping Archaeology in Heritage." In *Taking Archaeology Out of Heritage*, edited by Emma Waterton and Laurajane Smith, 170-91. Newcastle upon Tyne: Cambridge Scholars Publishing.

———. 2011. "The Database as Material Culture." *Internet Archaeology [online]* 29. doi: https://doi.org/10.11141/ia.29.8.
Olsen, Bjørnar. 2010. *In Defense of Things : Archaeology and the Ontology of Objects*. Lanham: AltaMira Press.
———. 2012. "After Interpretation: Remembering Archaeology." *Current Swedish Archaeology* 20:11-34.
Outstories Bristol. 2018. "Mapping LGBT+ Bristol." Accessed 20th November. http://outstoriesbristol.org.uk/map/#osb/kyp/115.
Pétursdóttir, Þóra. 2012. "Small Things Forgotten Now Included, or What Else Do Things Deserve?" *International Journal of Historical Archaeology* 16 (3):577-603. doi: 10.1007/s10761-012-0191-0.
Phillips, Charles William. 1959. "Archaeology and the Ordnance Survey." *Antiquity* 33 (131):195-204.
Richards, Julian D., Ulf Jakobsen, David Novák, Benjamin Štular, and Holly Wright. 2021. "Digital Archiving in Archaeology: The State of the Art. Introduction." *Internet Archaeology [online]* 58. doi: https://doi.org/10.11141/ia.58.23.
Roberts, Julia, and Kathleen Sheppard. 2020. "Introduction: clusters of knowledge." In *Communities and knowledge production in archaeology*, edited by Julia Roberts, Kathleen Sheppard, Ulf R. Hansson and Jonatha R. Trigg, 1-13. Manchester: Manchester University Press.
Saunders, Harold H. 2005. "The Concept of Relationship." In *Politics Is about Relationship*, 60-81. New York: Palgrave Macmillan.
Schofield, John. 2017. "'Deviants, punks and Pink Fairies': counter-archaeologies for unreasonable people." *World Archaeology* 49 (3):281-90. doi: 10.1080/00438243.2017.1383182.
Smith, Laurajane. 2006. *Uses of Heritage*. London; New York: Routledge.
Tait, Graham, and Ben Wallace. 2019. *A Guide to Historic Environment Records (HERs) in England*. London/ Swindon: Historic England.
Tully, Gemma, Chiara Piai, Jesús Rodríguez-Hernández, and Elodie Delhommeau. 2019. "Understanding Perceptions of Cultural Landscapes in Europe: A Comparative Analysis Using 'Oppida' Landscapes." *The Historic Environment: Policy & Practice* 10 (2):198-223. doi: 10.1080/17567505.2019.1587251.
Vlaanderen Onroerend Erfgoed. "Thesaurus." https://thesaurus.onroerenderfgoed.be.
Waterton, Emma. 2005. "Whose Sense of Place? Reconciling Archaeological Perspectives with Community Values: Cultural Landscapes in England." *International Journal of Heritage Studies* 11 (4):309-25. doi: https://doi.org/10.1080/13527250500235591.
———. 2010. *Politics, Policy and the Discourses of Heritage in Britain*. Basingstoke: Palgrave Macmillan.
Waterton, Emma, and Laurajane Smith. 2009. *Taking Archaeology Out of Heritage*. Newcastle upon Tyne: Cambridge Scholars Publishing
Watson, Steve. 2009. "Archaeology, Visuality and the Negotiation of Heritage." In *Taking archaeology out of heritage*, edited by Emma Waterton and Laurajane Smith, 28-47. Newcastle upon Tyne: Cambridge Scholars Publishing.
Webmoor, Timothy, and Christopher L. Witmore. 2008. "Things Are Us! A Commentary on Human/Things Relations under the Banner of a 'Social' Archaeology." *Norwegian Archaeological Review* 41 (1):53-70. doi: 10.1080/00293650701698423.

Westin, Jonathan. 2012. "Towards a vocabulary of limitations: the translation of a painted goddess into a symbol of classical education." *International Journal of Heritage Studies* 18 (1):18-32. doi: 10.1080/13527258.2011.590818.
Witmore, Christopher L. 2007. "Symmetrical archaeology: excerpts of a manifesto." *World Archaeology* 39 (4):546-62. doi: 10.1080/00438240701679411.
Wright, Holly, and Julian D. Richards. 2018. "Reflections on Collaborative Archaeology and Large-Scale Online Research Infrastructures." *Journal of Field Archaeology* 43 (sup1):S60-S7. doi: 10.1080/00934690.2018.1511960.
Yeo, Geoffrey. 2018. *Records, Information and Data: Exploring the role of record-keeping in information culture*. London: Facet Publishing.

Paper III

Anmeldelser • Nordic museology 2020 • 1, s. 120–126

Anmeldelser / Reviews

Exhibitions

Göteborgs Födelse (The Birth of Gothenburg). Permanent Exhibition, Gothenburg City Museum, Gothenburg, Sweden

Early 2017 was somewhat hectic for me. It marked a significant turning point in my life, namely moving to Gothenburg to start my doctoral studies. Like most doctoral applicants, I had devised a proposal, which despite some deviations, I have more or less stuck to. Still, it was only upon my first visit to the then newly inaugurated *Göteborgs Födelse* exhibition at Gothenburg City Museum that I was able to comprehend the material I intended to work with fully. It marked the start of an ongoing relationship, one which continually develops with every moment of contemplation; such is the life of a doctoral student. I was intrigued by the question how, and why, certain events, actors and activities were deemed to exemplify Gothenburg's historic urban environment; for whom should this story be of interest, and what had they to gain from it?

Rather than an autobiographical account, however, this is a review of the exhibition. Conceptually, this is an exhibition, not only aiming to fossilise an account of the city's genesis into public narrative but also an exploration of the "first generations of Gothenburgers" (Sandén 2017:7). In many ways, this has the hallmarks of an Authorised Heritage Debate (Smith 2006), but on closer inspection that isn't necessarily the case. The city museum has a strong track record for critically approaching temporary exhibitions, peaking with the award of Exhibition of the Year in 2014 for their account of the lives of Roma populations in the city. In this case, *Göteborgs Födelse* represents a turn towards a critical museology for the museum's permanent exhibitions. While some of the critical approaches are more apparent, particularly in building awareness of the livelihoods of a broader spectrum of the historical society, this review also aims to clarify aspects that may be less apparent, such as the participatory nature of the exhibition's design.

Furthermore, in 2021 the 400th anniversary of the foundation of the city will be celebrated, preoccupying seemingly all institutions and organisation on a city-wide scale. The municipality has marked the City Museum as a "clear start and home base for the historical element of anniversary preparations" (Göteborg & Co 2017: 23), creating the unambiguous position that both *Göteborgs Födelse* and the urban space of the past are essential elements in the upcoming anniversary.

Gothenburg: the foundations

Enshrining the inception or foundation of a city, even one as comparatively young as Gothenburg, as an objectified space of collective identity, is commonly represented among governments and states. This not only aids the formulation of city identity and placemaking but also regularly merits

commercial value within the sphere of tourism. Through the negotiation of a sense of *longue durée* - a means of deriving a contemporary set of values from the city's foundation, there is a vague, but unmistakably evident genius loci within the centre of the city. This represents the everyday connections to the city's past through cues in the historic built environment. Thus, the decision to make the exhibition the heart of the celebration renders the role of the historic city as a 'first-place' (Santos 2017) in the city's identity all the more veritable.

The first place as performative spatiality and the associated heritage affect that Gothenburgers draw from the historic city centre, is not necessarily the same as the temporally, or chronologically first settlement associated with the geographic area. In many places, this primarily involves prehistoric settlement, though the direct influence on contemporary urban values is variable and seldom reaches beyond the landscape characteristics and settlement location. In Gothenburg's case, however, there are several intermediaries, such as the late medieval town of *Nya Lödose*, the town of *Älvsborg* with the adjacent fortress of *Gamla Älvsborg*, as well a short-lived predecessor to Gothenburg built by Karl IX on Hisingen in 1603. It is with these intermediaries that the exhibition begins.

Under the heading "a drama in three acts", the exhibition is demarcated into three sections, each with a specific theme: "Nya Lödöse 1473–1621"; "Göteborgs födelse 1621" and "Göteborg 1698". The visitor is then greeted with a short animation characterising the late medieval and early modern political and historical contexts resulting from the plague, *Kalmarunionen*, herring shortages and numerous outbreaks of war, that culminated with Gothenburg's establishment.

Nya Lödöse 1473–1621

We then begin with the historiography of *Nya Lödöse,* a story primarily informed by a series of recent and exhaustive excavations in the *Gamlestaden* area of the city (Cornell & Rosén 2018a), as well as several early twentieth-century interventions. Thematically, the visitor is informed that the story is one of fear, mainly of war and sickness, and this tension between survival and extinction is widely present throughout this section. In principle, the exhibition is intended to be understood through the gaze of a young girl, and her responses to the historical context around her. This has discernible consequences for the content: the Thirty Years War and the departure for New Sweden are largely absent, as it was deemed not to impact the world view of this character directly.

The first object and focal point of the exhibition is linked to this concept, focusing upon an engraved silver heart locket recovered from a grave context identified in the earlier excavations. The intention is that the object represents the heart of the city, but also it is perhaps implicit that the young girl whose perspective shapes our journey is the putative owner of the locket. The locket itself has been on display previously, but within a larger collection which was felt to lessen its impact. In this exhibition, however, it has been isolated as a 'hero object', drawing the audiences entire focus. The visitor's imagination is called upon to unlock "the secret of the heart", provoking interest from the sense of mystery rather than the complete comprehension of the object. This complements the pan-European research effort to source the locket's provenance well. The audio-accompaniment of a Poe-esque beating heart is slightly macabre, however.

The central theme of this component of the

exhibition is the difficulties of balancing the prosaicness of everyday life with the disruption of political unrest in *Nya Lödose*. The exhibition elucidates upon the periodic attacks on the settlement warranting the evacuation of the population for long and short periods (Cornell *et al.* 2018:193). This aspect of the exhibition is paralleled with the experiences of the present citizens; the notion of packing up one's livelihood in a chest and fleeing from war and strife is one shared by numerous migrants throughout the city, imbuing the exhibition with a far greater sense of proximity and immediacy.

Much of the exhibition was shaped by workshops with a test group of teenagers from a mixed area school in the city. While the collaboration with community groups for exhibitions such as "We Are Roma" was well documented, this is the first time such an exercise has been undertaken for the museum's permanent exhibitions. The result was the complete transformation of the previous seventeenth-century displays; making emotional affect the objective, rather than absoluteness, to captivate a teenage audience. The results were significantly manifested in the thematic approaches, object selection and the depth and precision of the accompanying texts.

It is the test group that we have to thank for the display of late medieval weaponry. Perhaps this may not add a great deal to the narrative to the adult visitor, though having spent my childhood regularly roaming the halls of the Royal Armouries in Leeds, I can undoubtedly relate to its inclusion. The selection of objects, in general, is sufficient, and the 'hero object' model serves the narrative thread well – in particular, highlighting the poor living conditions in *Nya Lödöse*. When combined with the scenography aesthetic envisioned by Kistone (2020), the consultants on the exhibition, the curated narrative is allowed to flow without being hampered by excessive text or object focus. In some cases, such as the juxtaposition of the statues of the Virgin Mary, St. Bridget (both deemed to be a better fit for the world view of a young girl than a Jesus figure) and the Archangel Michael with the squalor and sickness present in the settlement, the result is great empathy and serenity.

Göteborgs födelse 1621

Next follows a departure from the main narrative thread, showing how the plans and dreams for the city of Gothenburg became a reality. It begins with a more theoretical installation comparing More's *Utopia* with the planning of the city (fig. 1). Whilst the Utopian connections were not Swedish, and as Cornell et al. (2018:188) point out these connections were generally not Early Modern in provenance but the product of twentieth-century architectural theorisation, the exhibition's conflation of utopic values and the grid systems of the renaissance concept of the *Cittá Ideale* create a neat theoretical representation of the planning of the city. The defensibility and symmetry of the fortification is particularly well illustrated by the high- resolution scans of the original technical drawings of the city, commissioned from *Krigsarkivet* by the museum. Here, Gothenburg is presented as a product of the Dutch school of architectural development, whose inspiration presumably provides the link to the Italian renaissance ideal.

From the plans of the city, we are led through to an intended gathering space for pedagogical presentations for school groups. Instead, the space is dominated by a film montage created from a digital visualisation of the seventeenth-century city. The digitalisation itself warrants

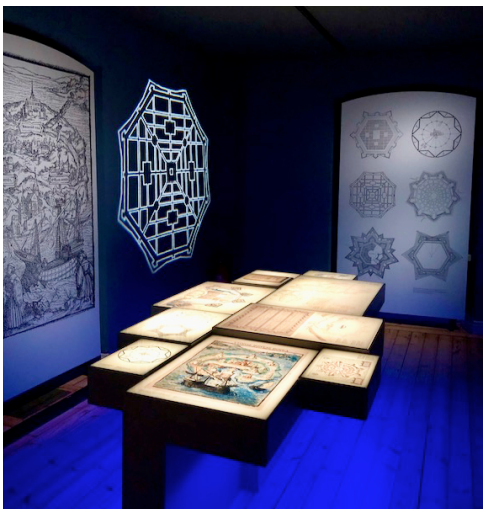


Fig. 1. Urban planning in the 1600's. Photo: William Illsley 2020.

an individual paper so, in this context, I shan't engage with an in-depth analysis of its content or construction.[1] Still, its impact on the narrative element is important.

To begin with, the model itself is not the product of the museum itself, but the municipal tourist board, *Göteborg & Co* and the city planners at *Stadsbyggnadskontoret*. As such, it was not clear from the beginning that it would be included in the exhibition. Moreover, because of this uncertainty, rather than focusing on the developmental stages of the city, we get a short visualisation of the foundations of *Stora Hamnkanalen* and then quickly move to a representation of Gothenburg as a fully-fledged city in 1698. Kistone's recording, representing the fledgling city's multi-ethnic workers building the canal ("Här kommer vattnet!"), no longer aligns with the visualisation. Resultantly, what ought to be the centrepiece of the exhibitions is a little jarring and disjointed.

From there, we are led through a short passageway, briefly discussing the foundation myths associated with the city, and touching upon the city's multi-national, multi-ethnic character that has endured to this day. This acknowledgement is well in keeping with the museum's general stance on identity formation in the city, though not as overtly as their *Urbanum* installation, for example. The past is then neatly brought into the present in the next room, where the photography of surviving seventeenth-century edifices are presented, both as a testament to the enduring *genius* loci and no doubt inspire further urban exploration.

This space is perhaps the most problematic in the exhibition and demonstrates a short-sightedness in the hypothetical young girl's vision. The issue largely lies with the map of the "World beyond Gothenburg". As a *stapelstad* with the right to foreign trade (Rosén 2017:39), Gothenburg not only formed a military stronghold but was also intended to front the states mercantile interests as the key access point to the West. Due to the thematic reluctance to explore colonialism, the attempt to shoehorn the emerging city's burgeoning internationally into the exhibition fails to analytically address Sweden's approach to extra-local interests and state possessions. Unfortunately, we see a continuation of the neutral stance on colonialism seen in the far less reflective permanent exhibition documenting eighteenth-century Gothenburg and its colonial interests. There is a building momentum, demonstrated by last year's International Biennale for Contemporary Art (GIBCA 2019) to find dedicated space for accessing the historiography of the city's relationship with these colonial affairs. In this



Fig. 2. Deciding my fate in the seventeenth-century. Photo: William Illsley 2020.

instance though, reductive statements on Gold coast forts and American settlements fail to redress state-sponsored injustices and provide little added value in narrative terms for the exhibition.

Positively, through the wheel of fortune in the same space (fig. 2), a simple analogue mechanism forgoing the previous room's experiment with digitality, allows fate to decide a proposed livelihood and lifestyle for the visitor to experience in seventeenth-century Gothenburg. The Wheel parallels the lifestyles of the powerful few to the comparably miserable majority as a means of demonstrating the social injustices of the time. Happily, I landed on 'Master Cobbler'

and would have been able to live a life of status. This route begins with a tale of what might be deemed an immigration success story, focusing on the life of Rutger Von Ascheberg, a Latvian military officer who rose to the position of Governor-General Gothenburg, Bohuslän and Dalsland. While this plays worryingly close to the 'the Good Immigrant' concept (Shukla & Suleyman 2019) we sadly bear witness to today, the intention is simply to show that wealth overcame all boundaries in the embryonic city.

Contrasted with the lives of the underclasses, it is not difficult to see why. Through the exhibition, we are privy to details regarding the legitimisation of the Swedish Jewry and the Roma, as well as the disenfranchisement of women largely addressed historically only by their gender roles – as wives or daughters. Even the concepts of capital punishment seem faintly beyond the lives of the wealthy, and the exhibition's documented account of the execution of Anna Jönsdotter for the crime of having a stillborn child reads as much to be punishment for poverty as it was for infanticide. While critically impressive, this final encounter with the seventeenth-century city is not without its flaws. Some social aspects, such as sexual repression, are a little tucked away, and some of the information could be made more upfront. Furthermore, while the object/ narrative balance remains consistent, it is perhaps at this point that the visitor craves a little more textual input. What is in most urgent need of redress is the digital stations dotted throughout this stage. On my latest visit, only one was in operation, leaving me feeling a little emptier than I ought to.

Critical concepts

Given that the seventeenth-century was for Sweden "an era of technical developments, socio-economic change and fervent religious activities" as well as a period of violence and the establishment of political legacies (Cornell & Rosén 2018b), it is far from an easy task to encapsulate the essence of the epoch. The test group's negative responses to the previous exhibition focusing on the city's foundation, and its attempt to show all, is perhaps the best testament to this. As far as critical approaches to the complexities and nuances regarding the politics and policies that surrounded the inception of Gothenburg and its first decades as a microcosm of contemporary Sweden, *Göteborgs Födelse* performs rather well. This exhibition draws much-needed attention to the multi-vocality of life in the city. I would hope that in the future the same gaze is cast over the exhibitions focusing on later Early Modern and Industrial periods in the city, particularly in relations to the cities ties to colonial processes.

Spatially, both to Kistone and the museum's credit, the scenography and curated route benefit the narrative immensely. The test group feedback ensures that this is equally apparent to children and teenagers without impacting the general accessibility of the account, which in itself represents a success of participatory museology. Building on this and the multi-cultural nature of the test groups, it is clear there is an attempt to meet the needs of a city as socially diverse as Gothenburg. It may not referenced by the museum in this context, but the migratory turn in museology called for by Johansson & Bevelander's recent compilation (2017) is being met here. While some issues ought not to be overlooked, particularly in regards to Gothenburg's role in Swedish colonial discourse, this is generally favourable and recommended to Gothenburgers and visitors of all backgrounds.

Notes

1. This review represents the first element of a more comprehensive doctoral case study of the historic environment in the city of Gothenburg and is to be followed up with an analysis of the digital model and an exploration of the networks enrolled in its delivery within the compilation of my thesis.

References

Literature

Cornell, Per, Anna Nilsson, Lennart Palm & Christina Rosén. 2018. "A Scandinavian town and its hinterland: The case of Nya Lödöse." *International Journal of Historical Archaeology,* 22: 186-202.

Cornell, Per & Christina Rosén. 2018a. "Introduction: Early modern urban periphery in Europe, the New Lödöse Project." *International Journal of Historical Archaeology,* 22: 183-85.

Cornell, Per & Christina Rosén 2018b. "Tracing Other in 17th-century Sweden." In Magdalena Naum & Fredrik Ekengren (eds.). *Facing Otherness in Eary Modern Sweden.* Woodbridge: The Boydell Press, 5-27.

Johansson, Christina & Pieter Bevelander (eds.) 2017. *Museums in a time of migration: Rethinking museums' roles, representations, collections and collaborations.* Lund: Nordic Academic Press.

Rosén, Christina. 2017. "Urbanism and the very small town. A case study from Western Sweden". In Per Cornell, Lars Ersgård & Andrine Nilsen (eds.). *Urban Variation. Utopia, Planning and Practice.* Raleigh, NC: Lulu Press, Inc, 33-78.

Sandén, Annika. 2017. "Förord/ Introduction." In Isa Andersson, Maria Forneheim & Håkan Strömberg (eds.). *Göteborgs födelse: The birth of Gothenburg.* Gothenburg: Göteborgs Stadsmuseum, 4-9.

Santos, Paula Mota. 2017. "The concept of 'first-place' as an Aristotelean exercise on the Metaphysics of Heritage." *International Journal of Heritage Studies,* 24: 121-27.

Shukla, Nikesh & Chimene Suleyman (eds.). 2019. *The Good Immigrant.* New York, Boston and London: Little, Brown and Company.

Smith, Laurajane. 2006. *Uses of Heritage*. London and New York: Routledge.

Press Releases

GIBCA. 2019. "Franska tomten: Shedding light on Swedish colonial history". Gothenburg International Biennial for Contemporary Art Accessed 16th October. http://gibca.se/rs_events/view/Franska_tomten_panel/?lang=en.

Göteborg & Co. 2017. "Together for an even better city: Anniversary Plan 2017." In Gothenburg: Göteborg & Co.

Web pages

Kistone. 2020. "We Are Kistone", Kistone AB,. https://www.kistone.se/we-are-kistone/. (Accessed 17th February)

William Illsley, PhD candidate,
CHEurope Project Early Stage Researcher
Institution for Literature, History of Ideas and Religion, University of Gothenburg
william.illsley@lir.gu.se

Paper IV

INTERNATIONAL JOURNAL OF HERITAGE STUDIES
https://doi.org/10.1080/13527258.2021.1977373

Routledge
Taylor & Francis Group

Check for updates

Digital surrogacy: politics and aesthetics in visualising the historical past of a city

William R. Illsley

Department for Literature, History of Ideas & Religion, University of Gothenburg, Gothenburg, Sweden

ABSTRACT

As part of the culturally focused direction of travel surrounding Gothenburg's fourth centenary, several departments of the municipality have collaborated to produce a virtual model of Gothenburg as it was in the seventeenth century, first presented to the public in 2017. This case study analyses the city's approaches to displaying and vitalising the model, the role of the built environment as a cultural backdrop, and the efficacy of cultural transmission within this digital context. Principally, this analysis offers a critical response to the depiction of the city's cultural heritage, but it also aims to examine the wider role of digital visualisation in contemporary heritage discourse. Characterising the realisation of the model's current iteration as a stepping stone for further development, potential points of departure for creativity and meaning-making within the model itself and in a broader context are made to inform future heritage practices in the city.

ARTICLE HISTORY
Received 5 November 2020
Accepted 2 September 2021

KEYWORDS
Visualisation; digital surrogacy; urban historic environment; heritage politics; digital heritage

Introduction

As both an urban space and place, the city has long been at the nexus of heritage and how it is communicated through art, be it the image, moving picture, music, or literature. However, if it is taken that 'heritage is not a fixed, unchanging thing, but something that is constructed, created, constituted and reflected by discourses' (Waterton 2010, 4), then it is equally important to retain sight of the evolving mechanisms for accessing and disseminating heritage information relating to such spaces. In order to be effective, 'a dialectic relationship between society and discourse' must be struck (2010, 7), requiring museums and heritage agencies to keep abreast of new means of delivering heritage. Digitality, representing one of several advances in cultural transmission, is not a new development. The 'combined data and knowledge revolution', as promoted by the parallel 'computing and digital revolution in modern media and communication' (Kristiansen 2014, 23), has long since spilled over into archaeological and historical studies and should be considered both interdisciplinary and global. As data is increasingly born digitally within the fields that feed museum curation, it is becoming ever more important that the heritage sector, whether professional or public, keep up with this direction of travel. As momentum is built along this vector and the various facets of digitality permeate society, contemporary audiences are increasingly expectant of communication methods that promote intellection in a format that is compatible with their daily routines (Petersson 2018, 83).

Given the current extent and prevalence of heritage visualisation across numerous sectors, including planning, management, marketing, entertainment, education, accessibility, and heritage preservation (Guttentag 2010, 637), it is not unusual for a city to present a version of their own

CONTACT William R. Illsley william.illsley@lir.gu.se Department for Literature, History of Ideas & Religion, University of Gothenburg, Gothenburg, Göteborg 40530, Sweden

© William R. Illsley

urban heritage in digital form; many urban centres are attempting to express their identity and heritage through the creation of a digital surrogate, which refers to the digital reproduction of a material object or place, (Conway 2014; Rabinowitz 2015) or historic visualisation. The Rome Reborn project (Flyover Zone 2021) and Visualizing Venice (2021) are frequently cited due to their extent and renown, but lesser-known models of similar origin in methodology, geography, and purpose are equally accessible; examples include the early modern explorations of Amsterdam (City of Amsterdam 2021) and Oslo (Tidvis 2020).

Analyses of virtual heritage models often focus heavily on their development and technical aspects; however, in this instance, through post-hoc analysis, this paper aims to summarise the effectiveness of historical visualisations in meeting a city's cultural, social, and historical demands. Comparable aspects can be drawn between similar projects, thereby signposting further opportunities to develop and align such visualisations alongside the malleability of heritage processes. The rationales behind the choices in public technologies and narratives, as well as representativity and the politics of aesthetic and experiential decisions, will be examined in order to communicate the criticality and reflexive uses of digitality in the current milieu of the city. This includes an exploration of the authenticity of spatial representation (i.e. the conscious choice to blend fact and fiction for the benefit of common understanding); the power structures of presentation both locationally and institutionally; usership, the politics of inclusion, as well as presence and interactivity; and finally, a discussion outlining the potential models that this format can realise with further creative input. With the aim of providing a general commentary on the process of creating, presenting, and communicating heritage through digital surrogacy, this case study presents the ways in which multiple publics engage with the heritage visualisation of the city of Gothenburg.

Digitally encountering the seventeenth-century city of Gothenburg

2021 marks the fourth centenary of the city of Gothenburg (now delayed until 2023) has placed a great deal of emphasis and pressure on its cultural and historical agencies to convey meaningful public heritages in a modern vein. Since the last centenary celebration of 1923 (similarly delayed by two years because of the aftermath of the first world war), which placed significant emphasis on crafts in the city and surrounding areas (Thorén 2011, 277) rather than the city itself, it is evident that not only have the structures of Gothenburg's demographics and built environment changed a great deal, so too have the socio-political contexts that they exist within. Therefore, within the epistemological context of heritage visualisation, a digital surrogate of Gothenburg as it was in the seventeenth century has been conceptualised by the city's municipality.

Development

This paper's focus is not on the techniques used to create the model; nevertheless, it is prudent to include a brief description of the model's development. It could be argued that it has a strong impact on both the underlying decision-making processes and its effectiveness in its various deployments. Conceived by Gothenburg & Co (the city's tourism, culture, and events board), the model represents the cultural intersect between the City Planning Office (Stadbyggnadskontoret), the Museum of Gothenburg, and the Visual Arena at Lindholmen Science Park. Much of the visualisation itself is concerned with the physical form of the city based on available archival material – primarily cartography in the form of architectural projections. In chronological terms, the depiction is presented to the public as illustrating the city as it was in 1698. It encompasses the entirety of the city within the inner fortifications, representing a space of approximately 70 hectares (Figures 1 and 2) – the outer fortifications are demarcated in the visualisation but the urban spaces within them are not included. There are additional aspects of city life depicted in various ways; these include human figures, foliage, water surfaces, and modes of transport.



Figure 1. A screenshot of the central square as it appears in the virtual reality application (pictures by Göteborgs Stad/©Stadsbyggnadskontoret).



Figure 2. A promotional image of the digital city (pictures by Göteborgs Stad/©Stadsbyggnadskontoret).

Its construction entailed procedurally modelling the more conspicuous of the city's edifices with Autodesk Maya and embedding them within a more generic 3D urban environment created with ESRI CityEngine, largely due to a lack of preserved buildings from the period. The cinematic aspects of the historic urban environment were then developed and rendered using the Unreal Engine. This phase was largely the responsibility of Stadsbyggnadskontoret. Much of the city space was produced

according to a standardised design. While this is unlikely to be accurately representative of Gothenburg as it appeared at the time, it does in some way mirror the known building techniques from the period. Despite the lack of preservation in the city, there is ample evidence for prefabricated log timber buildings that were produced north of the city and transported along the Göta river (Nilsen 2020, 84), particularly in light of the need for large-scale construction and replacement in response to fire or enemy attack.

The parallels between the standardised formats of the digital surrogate and the historic city are likely consequential more than a conscious choice, at least as far as is made evident to the user. This is consistent with the observation that cultural heritage professionals often provide content for digital applications but are seldom heavily involved in the design (Maye et al. 2017, 222). The Museum of Gothenburg largely operated in an advisory role for historical accuracy rather than a more creative capacity. Digitised versions of the architectural and cartographic plans of the city were requisitioned by the Museum from Krigsarkivet. Alongside the evidence produced from archaeological interventions, these projections provided the necessary source material for the visualisation. This substantiates the notion that there is a sparsity of academic historical input in such visualisations. The use of 'off-the-shelf' or well-established narratives is a markedly tendentious preference in heritage applications, especially when put together by local authorities or organisations where the focus is economically driven or regenerative (Poole 2017, 301). In this case, the visualisation represents the status quo in terms of official narratives and is thus not used as a research tool. Arrigoni, Schofield, and Pisanty (2019, 2) note that digitally focused collaborations are either 'driven by pre-determined research questions or requirements' or emphasise 'an experimentation and engagement with audiences, which takes precedence over particular outcomes'. Arguably, the Gothenburg approach falls somewhere between the two: it is caught between the fourth centenary as a cultural driving force but is simultaneously focused on new applications of digitality in the city's heritage sector.

Initially marketable events with greater visibility and cultural capital heralded the project's arrival into the public sphere before finding a more stable host at the Museum of Gothenburg. At present, this functions as the most prominent and stable mode of displaying the model. Virtual reality (VR) applications favouring head-mounted displays are the primary delivery format. This includes temporary displays utilising cell phone VR headsets, such as those used in the installation at the 2018 Gothenburg leg of the Volvo Ocean Race (Lagerlöf 2019) and the Gothenburg Culture Festival (Göteborgs Stadsmuseum 2019). There are also more permanent displays such as the Xbox One connection to an Oculus Rift platform in the entrance hall to the Museum as well as an augmented reality (AR) installation in the Tourist Information centre at Kungsportsplatsen. A video montage of the model has also been included as the centrepiece of the 'Birth of Gothenburg' exhibition, utilising fly-by views of the structures that are most prominent in the digital city's landscape. This can be seen on the City of Gothenburg's YouTube channel[1] and extracts have even made their way onto an episode of Sveriges Television's (SVT) '*Allt för Sverige*' (2019), a reality TV show where American contestants of Swedish origin return to Sweden to rediscover their ancestral ties.

Analysis

Criteria for analysis

Largely qualitative in nature, much of the focus in this analysis will be on the three incumbent displays of the model: the 'Birth of Gothenburg' exhibition, the VR installation in the Museum entrance hall, and the Tourist Information centre at Kungsportsplatsen. However, there are also significant observations to be made of the temporary installations and the ways in which the model was depicted. To reduce the subjective nature of this analysis and introduce a level of thoroughness, the experiences facilitated by the model on display in various modes in Gothenburg will be

measured against aspects of both the London Charter (Denard 2012) and the Seville Principles (International Forum of Virtual Archaeology 2011). The London Charter, considered to be particularly important (Pujol and Champion 2012, 85), took the first steps in establishing guidelines for the application of scholarly rigour to the products of 3D visualisation so that they might make valuable contributions on a wider scale beyond virtual heritage studies. The Seville Principles, in turn, served as a further set of guidelines to improving the implementation of the London Charter but with greater attention to the specific needs of archaeological heritage (Carrillo Gea et al. 2013, 208). Due to their relevance to the field, reference to these documents is an appropriate measure.

Urban spatial representation

While they may perhaps be the most unequivocal starting points, historical chorography and cartography are not in themselves unproblematic. As city plans from numerous years were used in the production of this project, minor historical discrepancies arose. For example, Skansen Kronan redoubt is presented in the visualisation as complete, although the roof was not finished until after 1700 (Statens Fastighetsverk 2021). Instead of merely pointing out that this is wrong, we should consider how digital surrogates are negotiated elsewhere. Westin and Hedlund use a high-profile example in the form of Rome as it appears in *Assassin's Creed 2: Brotherhood*. While clearly primarily a component of the entertainment industry, video games operate on multiple levels that include a degree of interaction with virtual heritage using visualisation as an ally to the process of storytelling (Champion 2015, 17). The Rome of *Assassin's Creed* is not a snapshot of a specific moment in time but an assemblage of archaeological fact and popular expectation, producing a Rome that is instantly recognisable. This phenomenon becomes representative of what has been coined a 'polychronia', a representation of features or artefacts from multiple points in time with the goal of achieving common understanding (Westin and Hedlund 2016, 16).

By the 1621 establishment of Gothenburg, the ideal city was on its way to becoming a symbol of early modern engineering (Wennberg 2018, 19). Gothenburg was built on the principle of maintaining effective control and defence. As such, many of the city plans' focal points allude solely towards important defensible assets. Fidelity to the source material and real-world constraints therefore depicts a city isolated within the model's virtual landscape. There are exceptions for the two redoubts, namely, Kronan and Lejonet as well as the Älvsborgs fortress, but the surrounding representation of the historic environment is necessarily stripped of its anthropological characteristics.

Gothenburg's higher ground is a good example of this. Early plans ahead of the city charter (1619/20) indicate that a castle of sorts should stand on Stora Otterhällan and a church is shown on Kvarnberget (Wennberg 2018, 25). Whilst this was never realised, by the time the fortification of the city was under the guidance of Eric Dahlbergh (1684–1719), the city had taken ownership of the high ground. It is known that a mill had once stood there); however, in peacetime, the city allowed those that could not buy and own a plot to build there until the land was required for defending the city. Renting plots next to the powder stores was understandably cheap. These spaces were not governed by the grid system demarcating the rest of the city, meaning there was a sense of impermanence to the housing and street plans on these escarpments (Öbrink, Williams, and Nilsen 2018, 291). The nature of the dwellings was not recorded in the plans and so is subsequently not reflected in the model, thereby obscuring the existence of the lower classes of Gothenburg society.

Lowenthal (2015, 498) argued that in '[P]rofessing to correct precursors' prejudices and to recover pre-existing truths, we fail to see how much of today we put in the past', resulting in a misrepresented past – idealised as its supposed 'best' out of shame or pride. In the first century of its existence, space in Gothenburg was divided economically rather than by nationality: the wealthy clustered together. Whilst it was recognised that the city required their labour contributions, there remained an evident disdain for the lower classes. Despite engaging in a symbiotic relationship with the residential district of Majorna, it was not until 1868 that it became part of Gothenburg because the city authorities had been reluctant to include such a large area of poor workers and sailors

(Hallén 2017, 207). Even Masthugget and Haga, which were part of the city from the outset despite being located outside the city gates and were only associated with the working classes in later centuries, were represented as geographically and socially peripheral (Nilsen 2020, 180). They are depicted as such in contemporary cartography and this is reproduced within the model. However, by pointedly drawing attention to such aspects within the model, reincluding undesirable or ignoble details of the city's past can be encouraged.

Whether deliberately or not, the architects of the digital city echo the political choices of their forebears. Where these methodologies for visualising historic cities are followed, a greater sense of awareness is required, and the decisions taken in the process of creation ought not to mask the exclusionary politics of the past. Under 'the methodological rationale of a visualisation' (Denard 2012, 66), where decisions have been made for aesthetic reasons, responsibility for the nature of the content should also be taken. It is often the case that political choices are made in the modelling process, yet they are seldom recognised as such.

Early modern heterotopia

As a literary-geographical analogy, Franco Moretti makes the point that 'geography is not an inert container, it is not a box where cultural history "happens", but an active force' (Moretti 1998, 3). Mapping is a connection to space made visible, but it is not the conclusion of geographical work (1998, 7). The same can be said of city visualisation: modelling a city is not the conclusion but the beginning. A city visualisation abides by specific configurations, but questions remain as to what narrative it relates concerning the lives of the people that inhabited the space. This notion of narrative can be expressed in three ways according to Dunn (2019, 98): they can facilitate change, document personal experience, or assert power. Using the analogy of Plato's Cave, Dunn goes on to argue that spatial media conditions the identities of nations, regions, communities, and individuals in spaces we have never seen and can never see (2019, 101). In this sense, there is a need to be more explicit about what space represents in the context of virtual heritage. Michel Foucault conceptualises such spaces as 'heterotopias'. Whereas utopias are fundamentally unreal spaces, operating as analogies to real spaces and presenting society in perfect form, some places exist simultaneously as 'mythical and real contestations of space' (Foucault and Miskowiec 1986, 24). By visualising maps and plans in 3D, we recognise Gothenburg, in this instance, as both a familiar city and as a digital object that exists in reality; at the same time, it is unreal as it has to pass through the 'utopian virtual point' of the past so as to be palatable for us to see it.

In relation to archaeo-historical visualisation, we attempt to translate the material of the graphosphere along with the material of reality into the digital hypersphere (Vandenberghe 2016, 38). However, reality holds too many variants for digital technology to account for, and mimesis is thus not possible. The relationship that exists between space, the built environment, and the society that would have inhabited it is not made explicit. Whilst there are shared visual similarities and characteristics between a historical city and its digital surrogate, the connection is largely superficial and unsentimental in experiential terms. Therefore, the goal should not be to just reproduce the map in a newer, more novel format. The goal should go deeper than data and juxtaposing materials as a means of authenticity and should strive for the emotional rather than the empirical.

Part past, part fiction

In *The Archaeology of Time Travel: Experiencing the Past in the 21st Century* Cornelius Holtorf defines time travel (within the capacity of current technological limitations) as an 'embodied experience and social practice in the present that brings to life a past or future reality … to experience the presence of another time period' (Holtorf 2017, 1), clarifying that 'historical re-

enactment and VR cannot bring the past back to life as it really was' (2017, 14). This is a truism as a matter of course; however, the marketing of virtual heritage puts forward the idea that the user will find the experience comparable to visiting a realised and accessible past.

The London Charter and the later Seville Principles are explicit in advocating for digital heritage visualisations to be seen to be 'at least as intellectually and technically rigorous as longer established cultural heritage research and communication methods' (Denard 2012, 59). To achieve this, scientific transparency, historical rigour, and authenticity must be testable. As the latter principles state, 'it should always be possible to distinguish what is real, genuine or authentic from what is not'; this is a standard that should be achievable for both a professional and a public audience (International Forum of Virtual Archaeology 2011). Due to the gaps in archaeo-historic knowledge regarding Gothenburg's architectural morphology and the generic visualisation methodology to compensate for this, the necessary transparency has not hitherto been clearly achieved.

In such a context, it is inevitably difficult to separate the real from the speculative but there are nevertheless ways of counterbalancing this through effective presentation. The primary issue is the sparsity of preparatory information available to the prospective virtual user to mitigate the sense of verisimilitude. Semantically, the language used in the Gothenburg case (Figure 3), namely, 'catch a glimpse of . . . ', 'showing . . . ', and 'experience in Gothenburg', indicates a degree of certainty. They leave no room for questions or interpretations but demand to be recognised as truth. By employing these semantics and incorporating the material into an assemblage of public narratives (Latour and Woolgar 1986, 106), historical reference is lost through the media performance of visual representation. Uncertainties and negotiations are forgotten and the representation is seen as fact (Westin 2014, 139).

If one were to delve deeper and follow the audio description complementing the film in the 'Birth of Gothenburg' exhibition, the boundaries between what is real and what is not are interwoven within the narrative, further blurring the lines between certainty and uncertainty. In the introduction, we are told:

> This film is a computer-animated journey through seventeenth-century Gothenburg. The 3D motion pictures create a feeling both real and unreal at the same time. Some surfaces and objects are so detailed that they feel real, such as the water surface, the sky, the flowers, and trees. Others are only hinted at, such as the people, who appear as grey, still-standing paper silhouettes. They are slightly reminiscent of a computer game. (Göteborgs Stadsmuseum 2017)[2]



Figure 3. The textual provision for preparatory information i) alongside the film in the 'Birth of Gothenburg' exhibition, ii) at the Kungsportsplatsen tourist information centre, and iii) at the Museum's VR station (photos by the author).



Figure 3. Continued.

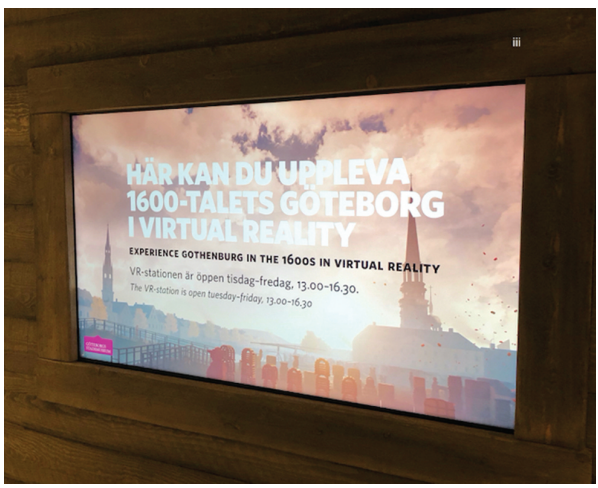


Figure 3. Continued.

Moderation of the textual provisions would help temper the public's expectations. Rather than addressing the areas of spatial uncertainty, the text's focus is on the lack of human characters. This relates to both the user and the content. It is assumed that the model is immersive because of the VR application; however, in reality, there is a certain distance between the process of embodiment and that of movement through the digital space. Mediated by the console controller and the Unreal Engine, the user moves an avatar of themselves via a first-person camera view. This distance is magnified by the speed at which the camera moves through the space. Going faster and smoother than a person on foot might, this was recently likened by a student of mine to the experience of

riding an e-scooter through the seventeenth century. A similar contemporary analogy can be made for the VR perspective on display at the Culture Festival. Here, via a mobile head-mounted display, the visualisation follows a prescribed path over the city; rather than the angelic perspective we might once have imagined of Rome in all its antiquarian glory, however, we are treated to a dispassionate and impartial drone's eye view of the early modern city.

Presence

In the User Manual for his book *Production of Presence*, Gumbrecht (2004) states that presence, as he utilises the term, refers mainly to spatial rather than temporal phenomena. However, when the goal is to explore space in time – as is the case when exploring virtual heritage in immersive media – then the question of presence requires deeper consideration in light of the inherent anachronisms that arise. Separating time and space as a scientific convention serves little purpose in this instance; instead, the focus ought to be on pursuing an understanding of organised space. This requires a 'technically efficient environment, establishing a framework for the social system, and providing a starting point for the work of ordering the surrounding universe' (Leroi-Gourhan 1993, 322). Presence is the key to the realisation of the heritage aspect in visualising a city so as to 'attempt to convey not just the appearance but also the meaning and significance of cultural artefacts and the associated social agency that designed and used them' (Champion 2019, 341). Cultural presence is established through what Champion (2009) describes as hermeneutic richness, 'the depth of affordance that a virtual environment gives to the interpretation of a natively residing culture in that virtual environment'. Crucially, this is achievable even in instances where digital architects 'do not have the technology to simulate believable and authentic NPCs (Non-Playing Characters), and avatars as cultural agents' (Champion 2009, 41).

In creating a digital surrogate, the 'paper silhouettes' approach adopted by the model operates as a means of communicating scale within the model but not as a means of creating presence. Whilst they may be considered as elements that enrich the model, the function of such placeholders often primarily appears architectonic in character (Westin 2014, 144). The cues for activity in the Gothenburg example are taken primarily from the street furniture of early modern urbanity. Semiologically, artefacts of activity are in abundance within the digital space – albeit generically sourced – and are placed to prompt the user; ships in the canal and cargo-laden wharves indicate the city's mercantile function, canons and martial display signal the city's military clout, the hanging laundry and smoking chimneys indicate domestic activity, grinding wheels indicate blade sharpening, and yards full of hop plants indicate brewing practices. These elements alone, however, are not enough to sufficiently capture the meaning, social agency, or character of a city.

A significant issue is the mediation of the visual representation in becoming a material force. The efficacy of the cues relies upon the cognitive ability to relate ocular stimuli to prior knowledge through the distinct nature of cultural identifiers. If imposition and effect are developed through the techniques that produce the image and the network through which they are perceived (Debray and Rauth 1995, 530), then without this knowledge, the efficacy of the symbology is greatly reduced. The use of generic objects further dissipates cultural distinction. As we do not meet the merchants, sailors, soldiers, grinders, and brewers, nor encounter any tangible demonstration of domestic living, the meaning and scale of these activities are lost. Furthermore, there is no indication of the division of labour, family structures, gendered perspectives, or any sense of social and economic diversity or alterity. This is information that we have access to; alternative historical experiences are well known and are in other projects used as a key narrative thread in the Museum's approach to the city's formation.

In instances when this knowledge is not available before or during the visualisation experience, the capacity for a viewer to recognise the local processes that characterise Gothenburg is limited. Research suggests that background knowledge, experience, and personal conceptualisation aid the perception of digital artefacts (Galeazzi, Franco, and Matthews 2015, 479–81). On a city scale,

however, historical processes, social relationships, and causal agents are fundamental. Resultantly, the lack of any significant relation to the past magnifies the inherent anachronism of virtual time travel; rather than embracing this anachronism as a method of understanding the past and present (Petersson 2017), the model's human representation amplifies historical lacunae rather than bringing humanity into the visualisation.

Without human imposition, Scandinavian historicity (Orrman 2016, 161) no longer impacts Gothenburg. The model becomes a pristine space free from the consequences of the recurrent wars that characterised the kingdom of Sweden's international relations up until the 1720s; it is a city seemingly unafflicted by widespread crop failures and famines, untouched by epidemics, and unscathed by fire. We encounter a city standing in the vacuum of a culturally empty landscape, bathed in heavenly morning sunlight. Not unlike the way the sky is employed in the visualisation of Rome – with the sun at its zenith and the tranquillity and stillness of the unfathomable blue mirroring 'the calm centre of human culture' (Westin 2014, 146) – this resplendent dawn both hides urban inaccuracies and heralds the arrival of the perceived 'golden age' of Gothenburg. Blurring, distorting, or highlighting spaces of doubt in archaeo-historic visualisation has an accepted place when precisely deployed, but by using aesthetic methods such as avatar movement and sunlight, which are consistent throughout the models, the boundaries of uncertainty become equally unclear. Digital surrogates become unchanging, non-negotiable entities swept up in a narrative that withstands exploration or revisitation.

Audience matters

As a developing digital product, the model has naturally been subject to multiple iterations in different settings as a means of finding an audience. To some extent, the question of who it is intended for and what it is supposed to do remains unanswered. The practice of spreading it out across multiple platforms is not inherently bad; for example, hosting the model on a stable web platform as well as in an augmented reality application can function as long as the goal and audience remain coherent. Multiplicity may be contested against point two of the Seville Principle (International Forum of Virtual Archaeology 2011), which is to make the ultimate purpose or goal of the work completely clear. As a digital object, models can easily be mobilised, but this does not necessarily mean that the transmission and trajectory of heritage information will remain constant with each form of delivery. As audiences broaden, the varying degrees of participation we go through to experience the model can often be overlooked.

In Gothenburg, the range of variation can be encapsulated fairly well. Although it forms part of a more exceptional deployment rather than the norm, the Volvo Ocean Race has a role in attracting visitors and promoting the city as a destination with the explicit intention of giving a platform to its development programmes in an international setting (Kärnman 2019). However, more than merely projecting the city's internal narratives to a global audience, it could be argued that this event holds latent class differences in habitus and the reproduction of Bourdieusian social capital. Sailing is a sport that requires time and financial investment and has a tendency to be associated more with the production of greater economic capital gain than cultural capital gain (Ritchie 2015, 217). As a sport, it allows for status-seeking confirmation, reflecting the upper class's 'aesthetic/ethical dimensions, temporal/spatial orientations, material and symbolic status signs, and body hexis' (Booth and Loy 1999, 10). In essence, it is a world away from sports that emphasise 'physical contact, toughness, asceticism, and hard manual labour' that tends to be favoured by lower classes (Wilson 2002). As such, egalitarian access to the model is not likely to be a high priority at such events.

By contrast, the purpose of the installation at the Culture Festival was far more overtly the gain in cultural capital. The 2019 event had a far broader target audience with stages appealing to a greater cross-section of social classes, thereby emphasising ecological, social, and financial sustainability. Ostensibly, the local demographic was the principal target with the inclusion of primarily Swedish nomenclature with secondary texts available to Anglophones. Spatially, the event was more spread out and much less demanding in formalities, allowing for greater access by the general public. The

VR installation itself was located in the Jubileumspaviljongen, which was located outside the entrance to the Trädgårdsföreningen (the Garden Society of Gothenburg) at the foot of a main thoroughfare in the city. In terms of spheres of normative activity (Ellegård 2019, 8), it was far more likely to coincide with the pocket of local order for more people, thereby physically and socially enabling a broader spectrum of visitors.

Via a stationary AR installation, the Tourist Information centre at Kungsportsplatsen creates an additional audience dynamic. Here, a binocular viewing platform offers a time slice view of the former city gate, Kungsporten. The same platform also offers views of Gustav Adolfs torg (the main square) and Stora Bommen (the entrance to the harbour canal), focusing on places deemed intrinsically important to the city's past. Its accompanying English nomenclature, whilst not explicitly excluding Swedes, linguistically points to an external rather than an internal user. Whereas museums 'sacralise' objects, space, and history through the enunciation of knowledgeable discourse (Mota Santos 2012, 445), the Tourist Information centre packages it for immediate consumption. The issue is that the material content of the visualisation is the same. Although the setting does not necessarily exclude the city's inhabitants, its primary target audience is logically extra-local; without clearer semiotic transmission, annotation, or multimedia input, however, there is nothing to mediate the information for a tourist audience.

The museum and the virtual environment

Compared to the installation at the Tourist Information centre, the one at the Museum is more overtly positioned for twofold engagement with both locals and tourists. Its coincidence with the Museum's investment in a new permanent exhibition exploring Gothenburg's foundation also represents their primary concern with the city's history. As with many historical museums, historicity is derived not just through the discourse of its content but in the architecture of the building itself; the East India House, in which the Museum is located, has significant meaning in the development of the city and is itself a cultural landmark. Located in the historic centre of the city, the building is a relic of the peak of Gothenburg's mercantile past and has long demarcated a space for the culturally aware middle classes and wealthy benefactors (Falkemark 2010, 88) to maintain a stable identity in the city's early modern roots.

The space of the historic centre operates as both a first place (Mota Santos, 2017) and as the city's primary heritagescape. It is thus inextricably linked to a sense of heritage (Garden 2006). However, this cannot be said to be a universal heritage. Insulated within the historic centre, the Museum is in a somewhat restrictive location for marginalised populations. Property in the centre of Gothenburg is largely afforded only to institutions, businesses, and the wealthy; for the majority, issues surrounding class, ethnicity, and affordable accommodation mean that daily encounters in the city centre are largely between those who travel inwards from the peripheries of the city. The content and policy of the Museum are not in question in this regard; however, whilst the physical infrastructure of Gothenburg's seventeenth-century fortifications has long since gone, there remain social hurdles in accessing the past in the central city. This is often manifested in practices of stigmatisation and exclusion, with ambivalence and territorial association to suburban locale compensating for subordination and disassociation with the urban centre (Johansson and Nils 2011, 48).

Certainly, this space provides strong hermeneutic foundations for the model's display. The in situ video presentation as part of the 'Birth of Gothenburg' exhibition benefits from the knowledge-making capacity of the Museum, but the dynamic is altered as far as the experience of the VR station is concerned. Whilst it draws its sense of meaning from its valorised location and credibility from the intellectual authority of the Museum as a trusted institution (Bennett 1995, 146), it simultaneously becomes unchallengeable and isolated. It should be cautioned against merely brushing off these dynamics as 'soft power'. In his 1938 publication, *Power, A New Social*

Analysis, Bertrand Russell argued that due to the propagation of education, the intellectual lacks the awe and power over belief that their spiritual antecedents in the clergy possessed (Russell 2004, 33). However, this view negates the nuances and confrontation with power on a local level.

I argue instead that intellectual power works differently to the power over opinion of Russell's understanding. On the contrary, Foucault argues that intellectuals have been drawn closer to the masses as a result of 'real, material, everyday struggles' (Foucault 1980, 126). It is instead commonplace and accepted facts that are the building blocks of power. This is significant when, in light of alternative histories, an authorised narrative remains what is considered actual reality. Foucault's reading of power dynamics reveals his conclusion that truth is a product of 'a system of ordered procedures for the production, regulation, distribution, circulation, and operation of statements' (Foucault 1980, 133). When articulated in a museological context, a Foucauldian analysis of regimes of truth yields new truths and shapes social understanding for the inclusion of subaltern knowledges (Bennett 2018, 1).

Relatively, the visualisation gains its veracity from this setting, rather than its content. It engages in a pact of trust with space and place over the audience, using the weight of the Museum to formulate the user's expectations and experience. Whilst the video embedded in the exhibition has the clear purpose of illustrating the city's early beginnings, the Museum's VR station creates the possibility for users to explore the historic space; however, the installation enrols them within the ecology of the Museum's own internalised network.

Discussion

Neil Silberman points out that 'remembering and commemorating is not merely preserving or digitally reconstructing a mute building or object'. Where process rather than product is the focus, he continues, 'digital novelties whose rapid obsolescence, requires a constant flow of new, ever more visually striking representations just to keep up with the quickening pace of the digital age' (Silberman 2015, 3). In this mode, meaning and memory are the fundamental purposes, whether as a form of education or an act of heritage-making. Great care is needed in publicising the VR experience; in general, it is difficult to pair a journalistic or touristic ideal to such an experience as this approach often fails to communicate any specific objectives beyond its novelty.

Typically, the rhetoric surrounding visualisations to some extent speaks to the pursuit of technology for its own sake, cut adrift from any governing theory or principle (Parry 2005). Where it is confined within the paradigm of tourism, it is difficult to conceive of digital surrogates beyond the product on the display – it is, in a sense, rendered final. However, in terms of communicating archaeological or historic data in a hermeneutic context, digitality presents an unfixed space to develop a platform able to evolve in any one of several directions to fulfil a more meaningful role in the place-based heritage mechanisms and potentially define future digital praxis in Gothenburg and elsewhere.

The inclusion of material with greater heterogeneity would signify a critical step forward. Approaches that layer visual representation alongside databases are well-represented in virtual heritage projects. Although they are better known as paid virtual reality applications, the Rome Reborn (Wells et al. 2009) and Digital Karnak (2021) projects open in Google Earth and are annotated with information supplied by an associated database with links to landing pages, thereby offering greater depth than the mere visual representation of a digital surrogate. However, an archive that provides data is just one aspect of this issue. Importantly, it is the understanding of the re-use of archival material that is often limited by a lack of qualitative research. Archives, particularly those of an archaeological nature, lend themselves well to politicisation and an idealised past; when presented through digital surrogates, they can be problematic.

The Skopje 2014 project is a prime example of this. It utilises a Slavic Macedonian ideal that functionally enforced contemporary spatial division in what its detractors describe as ethnic segregation tied to the real-world erasure of the Ottoman urban space in the city (Mattioli 2014,

600). In models where the human aspect is only represented with placeholders, topics that aid engagement and inclusivity such as alterity, migration, and colonial affairs are all aspects of a city's past that could be integrated. For Gothenburg, the first call in this instance is to mirror the narratology of the 'Birth of Gothenburg' exhibition. In that installation, societal inequalities and historical living conditions are successfully incorporated within a holistic narrative (Illsley 2020). Historical lacunae are always present; however, rather than covering up the gaps by drawing on archaeological empiricism, in order to explore the humanistic aspect of time travel, a critical re-evaluation of the archives is a necessity.

An architectural spatial focus unbalances the anthropological epistemologies through which we encounter the digital city. Although it has been demonstrated that VR is a motivational and attractive medium, 'learning or understanding will only be achieved if the physical and virtual interfaces are multisensorial and intuitive enough' (Tost, Laia and Economou 2009, 161). An over-reliance on ocular-centric digital representation detracts from immersion. Aside from the occasional seagull, aural stimuli are lacking and the misleading audio description accompanying the exhibition needs attention. There is nothing in the way of meaningful olfactory or tactile stimuli. While early successes were seen with apps offering hybrid views of the past and present such as the Museum of London's Streetmuseum (currently offline for redevelopment purposes), the precedence was set by Tidvis (2020) visualisation of 'The Port of Oslo in 1798′. Their 3D visualisation, accessible via smartphone or tablet as well as through a web platform, works symbiotically with a curated walking tour focusing on historical sights, sounds, and scents.

This approach could first be trialled at the tourist bureau but also supplement existing walking tours. Augmented 4D city experiences are often focused on enhancing visitors' learning experiences within the sphere of cultural heritage (Niebling et al. 2018), but they can also augment the experiences of residents. The city of Gothenburg produces mapped walking tours in six languages with the intention of helping newly arrived denizens become better acquainted with the city as a historic environment. Routes correlate to the spaces within the boundaries of the historic city, offering the opportunity to create time-annotated AR snapshots using archival images and visualisation to ameliorate users' experience and deepen their historical understanding. By presenting the space in a manner accessible to tourists and residents alike with increased sensory engagement, this approach anchors the digital world in reality by shifting the focus towards an embodied experience.

In this iteration, the effective transmission of Gothenburg's urban heritage is sought through resolution, epitomising the assumption that 'visual realism, immersion, and navigation are sufficient to simulate the past, and constitute a universal didactic method' (Tost, Laia 2019, 2:2). Drawing on 'storytelling, responsive characters, emotivity, or enhanced interaction' (2019, 2:1) elevates the status of the traditional 3D architectural model. Reaching the benchmarks set by the London Charter and the Seville Principles should be important criteria in improving users' experience with the affective performance of heritage narratives. Relating the current experience to the turn towards critical thinking in the evaluation of digital cultural resources (Economou et al. 2019) must be applied here. One approach that might encapsulate much of this process, as well as the gamification aspect discussed below, could be exemplified by the Virtual Sydney Rocks (VSR) project, which currently allows for both guided tours and the user's freedom to explore (Devine 2012, 530). The ultimate goal of the VSR project is to promulgate active participation. Future developments will allow social and cultural immersion through role-playing varying by gender, social status, and ethnicity (Devine 2018, 179).

The limitations of architecturally focused models, 'both as a tool for archaeological research and as means of presenting cultural heritage to the public' (Woolford and Dunn 2013, 16:1), underline the need for a narrative focus throughout the process of visualisation. This calls for a reconceptualisation of how this information is retrieved from and characterised by digital surrogates. In their book *Theatre/Archaeology*, Pearson and Shanks describe theatre/archaeology as a blurred genre wherein academic, artistic, and cultural efforts converge (Pearson and Shanks 2001). An effective bridging between the self (the user) and space and place (the visualisation) could be achieved by

drawing upon theatre/archaeology's greater performativity of perceptual stimuli. Whilst some degree of interdisciplinarity is encountered, the bias is towards architectural components. True interdisciplinarity involves the regular and fluid exchange of ideas – in this case, from a greater breadth of disciplines – to achieve enrichment. By making available toolkits to supply cultural heritage practitioners with the understanding of how interactive technologies are built, there is the potential of better achieving interpretative and visitor experience goals. Whilst there are obvious limitations to these endeavours, notably time and funding (Maye et al. 2017, 230), taking advantage of such initiatives may, in turn, engender greater input for heritage epractitioners in the creative process. An example of this is the DigMus Project (Bäckvall 2020).

Gamification, using Champion's definition (2020) of a game – namely, that of 'a challenge that offers up the possibility of temporary or permanent tactical resolution without harmful outcomes to the real-world situation of the participant of content' – is a route that the Stadsbyggnadskontoret has already begun to consider. While the implication is that games are not able to 'record, preserve or recreate', nor communicate the need to care for the fragility of inanimate objects efficiently, they can be used to advance fact procurement and environmental presence, if not always cultural presence (Champion 2020). Such approaches enable digital cultural custodians to communicate, enrich, and educate those in the present through an understanding of the past as well as promote multi-modal interactivity. Heritage is often considered the enrolment of place-related values that can be aesthetic, historic, social, or spiritual (Champion 2008, 223) and not just simply factual or scientific. However, whether fictional or non-fictional, gamifying historic content should not be an attempt to establish authority or authenticity, nor should it reproduce unhelpful dichotomies between what is real or not. The focus should be the communication of meaning, a sense of place, and the promotion of 'history as a shared cultural process spread across multiple forms, practices, social domains, and stakeholders' (Chapman, Foka, and Westin 2016, 361). As a product of human activity, virtual spaces are never devoid of anthropological content. However, the architectural focus of the Gothenburg model and a great many others fail to achieve hermeneutic richness through insufficient inworld prompting or encouragement. By comparison, gamification offers access to a wider range of narratives, rather than paradoxically using novel technology to reaffirm the grand narratives of old.

Regarding the filmographic treatment of visualisation, non-linear narratives and the use of montage can be employed to visualise the city. Collaborative encounters with dedicated monteurs and narrators can move the visualisation beyond merely memorialising the city's mythologised form. Scale is the key to this approach. Selectively targeting specific sites such as entry points to the city, one or more of these approaches could be trialled. By narrowing the focus, the reality of historical politics such as the right to space, cultural capital, and alterity could be explored in order to intensify user engagement under the social conditions of both the past and present. This could, for example, draw influence from novel concepts such as *Papers, Please*, a critically acclaimed concept gamifying the responsibilities of an immigration officer from a fictional country targeting real-world reform through rethinking the conventions of gameplay and narrative design (Kelly 2015). This would, of course, demand more labour and attention, but it is likely that greater creative engagement with the subject will translate to greater user engagement.

Cultural and chronological context is clearly important, particularly in light of anniversary events. In Gothenburg, if the emphasis of rhetoric for the fourth centenary is 'a Gothenburg for everyone', then the topography of the model's propagation must be levelled. As digitality intrinsically supports and encourages mobility, pop-up museums at local transport or culture hubs or even empty shop spaces could be utilised to promote multi-sited curation in order to reach suburban population centres. However, in doing so, great care must be taken to not colonialise outlying heritage narratives. In essence, the goal should be participation in rather than the uptake of a narrative. If we consider museum entities and heritage as commons in relation to societal stakes and interest, then participation is both desirable and feasible. Although allowing for the reinterpretation and re-use of digital material is envisioned, it has yet to find its way into the Stadsbyggnadskontoret's repository for 3D data. Vis-à-vis Oslo, TidVis offers further inspiration

in open sourcing their files and encouraging the public to 'download, use, remix and build upon' their work. Very much in the 'hackathon' vein, this approach, whilst not necessarily stable or reliable (Arrigoni, Schofield, and Pisanty 2019, 6), would not only offer a creative stimulus but also establish a platform for the public to envision heritage through non-official channels that are disconnected from the political stances and choices of its current performative settings.

Conclusion

If four hundred years is considered a milestone for the city and its origin is central to its story, then genuine accessibility and the transcendence of status and space are required in realising the vision of a Gothenburg that involves everyone. Meaningful associations to the city's past via narratives focusing on the under classes and religious or ethnic minorities have already been demonstrated by the production of the 'Birth of Gothenburg' exhibition. Although both aesthetically pleasing and coupled to the exhibition's discourse, the visualisation of the seventeenth century's first outings have yet to build upon the critical dynamic established by the exhibition.

Reconfiguring the visualisation's form, narrative, and technological approaches are key to achieving this. There are numerous precedents that demonstrate various approaches to virtual heritage through digital surrogacy and, in some cases, multiple combinations within the same digital iteration of space. In contemporary museology and tourism, it has become both relatively simple and commonplace to utilise computer visualisations for communicating heritage. However, while it is clear that there is a degree of imagination required on behalf of the user, it is no longer enough to simply offer a digitised space and allow the technological aspect to provide vitality. A wider understanding of the audience and their needs is especially necessary when the digital representation of objects and spaces is increasingly profane. In a world where the museum industry can seldom compete with the digital aesthetics of the entertainment industry in terms of digital renderings of space, evincing a critical commitment to sources, the procedures of creation, and the politics of presentation becomes a necessity. Authority is thus sought through transparency, engagement, and accessibility.

Notes

1. https://youtu.be/xdzOGq4qijM
2. Author's translation.

Acknowledgments

Many thanks to Andrine Nilsen for an excellent critical discussion in the preparation of this paper; to Carina Sjöholm, Dennis Axelsson, and Tom Wennberg of the City of Gothenburg Museum for their feedback and facilitating my secondment, as well as to Arvid Försberg of Stadsbyggnadskontoret for the preview of the model and the screen captures.

Disclosure statement

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Funding

This work was supported by funding from the European Union through the Marie Skłodowska-Curie Innovative Training Network 'CHEurope: Critical Heritage Studies and the Future of Europe' H2020 Marie Skłodowska-Curie Actions [722416]

Notes on contributor

William R. Illsley is a PhD candidate and early-stage researcher on the CHEurope project. He studies archaeological archives and visualisations as digital manifestations of heritage. His primary aim is to explore the digital spaces through which the public encounter the historic environment.

ORCID

William R. Illsley http://orcid.org/0000-0002-8917-663X

References

Allt för Sverige. 2019. Season 9, episode 5. Directed by C. Åkerlund. Aired November 24th,2019, on SVT 1.

Arrigoni, G., T. Schofield, and D. T. Pisanty. 2019. "Framing Collaborative Processes of Digital Transformation in Cultural Organisations: From Literary Archives to Augmented Reality." *Museum Management and Curatorship* 1–22. doi:10.1080/09647775.2019.1683880.

Bäckvall, M. 2020. "The DigMus Project: Newly Funded Project through Nordplus." The Digital Humanities Uppsala Blog, Accessed May 19th. http://digitalhumanities.blogg.uu.se/2020/05/14/the-digmus-project-newly-funded-project-through-nordplus/?fbclid=IwAR3Qn199VpyaFQSHiitfERpOmj5lZFQN3EG5xV53Q92B5AqS7zJpic3gxxQ

Bennett, T. 1995. *The Birth of the Museum: History, Theory, Politics*. Abingdon: Routledge.

Bennett, T. 2018. *Museums, Power, Knowledge: Selected Essays*. Abingdon: Routledge.

Booth, D., and J. Loy. 1999. "Sport, Status, and Style." *Sport History Review* 30 (1): 1–26.

Champion, E. 2008. "Otherness of Place: Game-based Interaction and Learning in Virtual Heritage Projects." *International Journal of Heritage Studies* 14 (3): 210–228. doi:10.1080/13527250801953686.

Champion, E. 2009. "Roles and Worlds in the Hybrid RPG Game of Oblivion." *International Journal of Role-Playing* 1: 37–51.

Champion, E. 2015. *Critical Gaming: Interactive History and Virtual Heritage*. Farnham: Ashgate Publishing.

Champion, E. 2019. "From Historical Models to Virtual Heritage Simulations." In Der Modelle Tugend 2.0: Digitale 3D-Rekonstruktion als virtueller Raum der architekturhistorischen Forschung, edited by P. Kuroczyński, M. Pfarr-Harfst and S. Münster, 337–351. Heidelberg: arthistoricum

Champion, E. 2020. "Culturally Significant Presence In Single-Player Computer Games." *Journal on Computing and Cultural Heritage* 13 (4): 4. doi:10.1145/3414831.

Chapman, A., A. Foka, and J. Westin. 2016. "Introduction: What Is Historical Game Studies?" *Rethinking History* 21 (3): 358–371. doi:10.1080/13642529.2016.1256638.

City of Amsterdam. 2021. "De Groei Van De Grachtengordel/Expansion of Amsterdam in the Seventeenth Century." Accessed March 11th. https://maps.amsterdam.nl/?LANG=en

Conway, P. 2014. "Digital Transformations and the Archival Nature of Surrogates." *Archival Science* 15 (1): 51–69. doi:10.1007/s10502-014-9219-z.

Debray, R., and E. Rauth. 1995. "The Three Ages of Looking." *Critical Inquiry* 21 (3): 529–555. doi:10.1086/448763.

Denard, H. 2012. "A New Introduction to the London Charter." In *Paradata and Transparency in Virtual Heritage*, edited by A. Bentkowska-Kafel, H. Denard, and D. Baker, 57–72. Farnham: Ashgate Publishing .

Devine, K. 2012. "Making Place: Designing and Building an Engaging, Interactive and Pedagogical Historical World." In 2012 *16th International Conference on Information Visualisation*, 528–533. Montpellier, France.

Devine, K. 2018. "A Drama in Time: The Life of A City." In *Cities in the Digital Age: Exploring Past, Present, and Future*, edited by A. G. da Câmara, C. Bottaini, D. Alves, H. Murteira, H. Barreira, M. L. Botelho, and P. S. Rodrigues, 173–184. Porto: CITCEM–Centro de Investigação Transdisciplinar Cultura, Espaço e Memória.

Digital Karnak. 2021. "Digital Karnak." University of California, Accessed April 28th. http://dlib.etc.ucla.edu/projects/Karnak

Dunn, S. 2019. "A History of Place in the Digital Age." In *Digital Research in the Arts and Humanities*. Abingdon: Routledge.

Economou, M., I. Ruthven, A. Galani, M. Dobreva, M. de Niet, M. Economou, I. Ruthven, A. Galani, M. Dobreva, and M. D. Niet. 2019. "Editorial Note for Special Issue on the Evaluation of Digital Cultural Resources—January 2019." *Journal on Computing and Cultural Heritage* 12 (1): 1–3. doi:10.1145/3307313.

Ellegård, K. 2019. "The Roots and Diffusion of Time-Geography." In *Time Geography in the Global Context: An Anthology*, edited by E. Kajsa, 1–18. London: New York: Routledge.

Falkemark, G. 2010. "The Gothenburg Spirit." In *(Re)searching Gothenburg: Essays on a Changing City*, edited by H. Holgersson, C. Thörn, H. Thörn, and W. Mattias, 83–90. Göteborg: Glänta Produktion.

Flyover Zone. 2021. "Rome Reborn." Accessed March 11th. https://www.romereborn.org

Foucault, M. 1980. *Power/ Knowledge: Selected Interviews and Other Writings 1972–1977*, Translated by C. Gordon, L. Marshall, J. Mepham, and K. Soper. New York: Pantheon.
Foucault, M., and J. Miskowiec. 1986. "Of Other Spaces." *Diacritics* 16 (1): 22–27. doi:10.2307/464648.
Galeazzi, F., P. D. G. D. Franco, and J. L. Matthews. 2015. "Comparing 2D Pictures with 3D Replicas for the Digital Preservation and Analysis of Tangible Heritage." *Museum Management and Curatorship* 30 (5): 462–483. doi:10.1080/09647775.2015.1042515.
Garden, M. E. 2006. "The Heritagescape: Looking at Landscapes of the Past." *International Journal of Heritage Studies* 12 (5): 394–411. doi:10.1080/13527250600821621.
Gea, C., M. Juan, J. L. Ambrosio Toval, F. Alemán, J. Nicolás, and M. Flores. 2013. "The London Charter and the Seville Principles as Sources of Requirements for E-Archaeology Systems Development Purposes." *Virtual Archaeology Review* 4 (9): 205–211. doi:10.4995/var.2013.4275.
Göteborgs Stadsmuseum. 2017. *Göteborgs Födelse*. Gothenburg: Göteborgs Stadsmuseum.
Göteborgs Stadsmuseum. 2019. "Upplev 1600-talets Göteborg I Virtual Reality." Gothenburg Culture Festival, Accessed September 30th. https://gothenburgculturefestival.com/program/29217
Gumbrecht, H. U. 2004. *Production of Presence: What Meaning Cannot Convey*. Stanford: Stanford University Press.
Guttentag, D. A. 2010. "Virtual Reality: Applications and Implications for Tourism." *Tourism Management* 31 (5): 637–651. doi:10.1016/j.tourman.2009.07.003.
Hallén, P. 2017. "The Dual Town 1730–1815: Trade as a Transformation Force of the Early Modern Town - the Case of Göteborg and Majorna" In *Urban Variation. Utopia, Planning and Practice*, edited by P. Cornell, L. Ersgård and A. Nilsen, 189–210. Raleigh, NC: Lulu Press, Inc.
Holtorf, C. 2017. "The Meaning of Time Travel." In *The Archaeology of Time Travel: Experiencing the Past in the 21st Century*, edited by B. Petersson and C. Holtorf, 1–24. Oxford: Archaeopress.
Illsley, W. R. 2020. "Göteborgs Födelse (The Birth of Gothenburg). Permanent Exhibition, Gothenburg City Museum, Gothenburg, Sweden." *Nordisk Museologi* 28 (1): 120–126. doi:10.5617/nm.7988.
International Forum of Virtual Archaeology. 2011. *Principles of Seville: International Principles of Virtual Archaeology*. Seville: International Forum of Virtual Archaeology.
Johansson, T., and H. Nils. 2011. "The Art of Choosing the Right Tram: Schooling, Segregation and Youth Culture." *Acta Sociologica* 54 (1): 45–59. doi:10.1177/0001699310392602.
Kärnman, K. 2019. "Let the Adventure Begin!" Göteborg & , Accessed 30th September 30th. https://goteborgco.se/en/tag/volvo-ocean-race-en
Kärnman, K. 2019. "Let the Adventure Begin!" Göteborg & Co. Accessed 30th September. https://goteborgco.se/en/tag/volvo-ocean-race-en/
Kelly, M. 2015. "The Game of Politics." *Games and Culture* 13 (5): 459–78. doi:10.1177/1555412015623897
Kristiansen, K. 2014. "Towards a New Paradigm? Towards a New Paradigm? the Third Science Revolution and Its Possible Consequences in Archaeology." *Current Swedish Archaeology* 22 (1): 11–34. doi:10.37718/CSA.2014.01.
Lagerlöf, B. 2019. "Gör En Virtuell Resa På 400 År Genom Göteborg." Vårt Göteborg, Accessed September 30th. https://vartgoteborg.se/gor-en-virtuell-resa-pa-400-ar-genom-goteborg
Latour, B., and S. Woolgar. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press.
Leroi-Gourhan, A. 1993. *Gesture and Speech*, Translated by A. B. Berger. Cambridge, Massachusetts: MIT Press.
Lowenthal, D. 2015. *The Past Is a Foreign Country - Revisited*. Cambridge: Cambridge University Press.
Mattioli, F. 2014. "Unchanging Boundaries: the Reconstruction of Skopje and the Politics of Heritage." *International Journal of Heritage Studies* 20 (6): 599–615. doi:10.1080/13527258.2013.818569
Maye, L. A., D. Bouchard, G. Avram, and L. Ciolfi. 2017. "Supporting Cultural Heritage Professionals Adopting and Shaping Interactive Technologies in Museums." In *DIS '17: Proceedings of the 2017 Conference on Designing Interactive Systems*, edited by O. Mival, M. Smyth, and P. Dalsgaard, 221–232. Edinburgh: Association for Computing Machinery.
Moretti, F. 1998. Atlas of the European Novel 1800-1900. London; New York: Verso
Mota Santos, P. 2012. "The Power of Knowledge: Tourism and the Production of Heritage in Porto's Old City." *International Journal of Heritage Studies* 18 (5): 444–458. doi:10.1080/13527258.2011.598541
Mota Santos, P. 2017. "The Concept of 'First-place' as an Aristotelean Exercise on the Metaphysics of Heritage." *International Journal of Heritage Studies* 24 (2): 121–127. doi:10.1080/13527258.2017.1393448
Niebling, F., F. Maiwald, K. Barthel, and M. E. Latoschik. 2018. "4D Augmented City Models, Photogrammetric Creation and Dissemination." In *Digital Research and Education in Architectural Heritage*. UHDL 2017, DECH 2017. Communications in Computer and Information Science, vol 817, edited by S. Münster, K. Friedrichs, F. Niebling, and A. Seidel-Grzesińska, 196-212. Cham: Springer.
Nilsen, A. 2020. *Vernacular Buildings and Urban Social Practice: Wood and People in Early Modern Swedish Society*. Oxford: Archaeopress.
Öbrink, M., G. Williams, and A. Nilsen. 2018. "Townscapes: Utopia and Practice in a Thematic Comparison of Nya Lödöse and Gothenburg." *International Journal of Historical Archaeology* 22 (2): 274–301. doi:10.1007/s10761-017-0423-4.

Orrman, E. 2016. "Growth and Stagnation of Population and Settlement." In *The Cambridge History of Scandinavia: Volume II 1520-1870*, edited by E. I. Kouri and J. E. Olesen, 135–175. Cambridge: Cambridge University Press.
Parry, R. 2005. "Digital Heritage and the Rise of Theory in Museum Computing." *Museum Management and Curatorship* 20 (4): 333–348. doi:10.1080/09647770500802004.
Pearson, M., and M. Shanks. 2001. *Theatre/Archaeology*. London. New York: Routledge.
Petersson, B. 2017. "Anachronism and Time Travel." In *The Archaeology of Time Travel*, edited by B. Petersson and C. Holtorf, 281–298. Oxford: Archaeopress Publishing .
Petersson, B. 2018. "From Storing to Storytelling: Archaeological Museums and Digitisation." In *Archaeology and Archaeological Information in the Digital Society*, edited by I. Huvila, 70–105. London: New York: Routledge.
Poole, S. 2017. "Ghosts in the Garden: Locative Gameplay and Historical Interpretation from Below." *International Journal of Heritage Studies* 24 (3): 300–314. doi:10.1080/13527258.2017.1347887.
Pujol, L., and E. Champion. 2012. "Evaluating Presence in Cultural Heritage Projects." *International Journal of Heritage Studies* 18 (1): 83–102. doi:10.1080/13527258.2011.577796.
Rabinowitz, A. 2015. "The Work of Archaeology in the Age of Digital Surrogacy." In *Visions of Substance: 3D Imaging in Mediterranean Archaeology*, edited by B. R. Olson and W. R. Caraher, 27–38. Grand Forks: Digital Press @ The University of North Dakota.
Ritchie, I. 2015. "Social Class and Sport." In *Routledge Handbook of the Sociology of Sport*, edited by R. Giulianotti, 210–219. London, New York: Routledge.
Russell, B. 2004. *Power: A New Social Analysis*. London, New York: Routledge.
Silberman, N. 2015. "What are Memories Made Of? the Untapped Power of Digital Heritage." In *Behind the Pixel: Practices and Concepts in Virtual Reality*, edited by L. P. Tost and S. M. Subías, 1–9. Barcelona: Universitat Pompeu Fabra.
Statens Fastighetsverk. 2021. "Skansen Kronan, Göteborg." Statens Fastighetsverk, Accessed April 7th. https://www.sfv.se/fastigheter/sok/sverige/vastra-gotalands-lan/skansen-kronan-goteborg
Thorén, C. 2011. "Till Allmänhetens Tjänst." In *Att Fånga Det Flyktiga: Göteborgs Museum 150 År*, edited by M. Sjölin, 268–281. Stockholm: Göteborgs stadsmuseum & Carlssons Bokförlag.
Tidvis. 2020. "The Port of Oslo in 1798." Tidvis AS, Accessed May 26th. https://oslohavn1798.no
Tost, Laia, P. 2019. "Did We Just Travel to the Past? Building and Evaluating with Cultural Presence Different Modes of VR-Mediated Experiences in Virtual Archaeology." *Journal on Computing and Cultural Heritage* 12 (1): 1–20. doi:10.1145/3230678.
Tost, Laia, P., and M. Economou. 2009. "Worth a Thousand Words? the Usefulness of Immersive Virtual Reality for Learning in Cultural Heritage Settings." *International Journal of Architectural Computing* 7 (1): 157–176. doi:10.1260/147807709788549367.
Vandenberghe, F. 2016. "Régis Debray and Mediation Studies, or How Does an Idea Become a Material Force?" *Thesis Eleven* 89 (1): 23–42. doi:10.1177/0725513607076130.
Visualizing Venice. 2021. "Visualizing Venice: Exploring a Cities Past." Accessed March 11th. http://www.visualizingvenice.org/visu
Waterton, E. 2010. *Politics, Policy and the Discourses of Heritage in Britain*. Basingstoke: Palgrave Macmillan.
Wells, S., B. Frischer, D. Ross, and C. Keller. 2009. "Rome Reborn in Google Earth." In *Making History Interactive. Computer Applications and Quantitative Methods in Archaeology (CAA). Proceedings of the 37th International Conference Williamsburg, Virginia, United States of America*, March 22–26,2009, edited by B. Frischer, J. W. Crawford, and D. Koller. Oxford: Archaeopress.
Wennberg, T. 2018. "Hur Planerade Man Staden? Göteborg Som Ideal Stad Och Fästning." In *Göteborg: De Första 100 Åren*, edited by B. Lindberg, 19–32. Göteborg: Kungl: Vetenskaps- och Vitterhets-Samhället i Göteborg.
Westin, J. 2014. "Inking a Past; Visualization as a Shedding of Uncertainty." *Visual Anthropology Review* 30 (2): 139–150. doi:10.1111/var.12044.
Westin, J., and R. Hedlund. 2016. "Polychronia: Negotiating the Popular Representation of a Common past in Assassin's Creed." *Journal of Gaming & Virtual Worlds* 8 (1): 3–20. doi:10.1386/jgvw.8.1.3_1.
Wilson, T. C. 2002. "The Paradox of Social Class and Sports Involvement: The Roles of Cultural and Economic Capital." *International Review for the Sociology of Sport* 37 (1): 5–16. doi:10.1177/1012690202037001001.
Woolford, K., and S. Dunn. 2013. "Experimental Archeology and Serious Games: Challenges of Inhabiting Virtual Heritage". *Journal on Computing and Cultural Heritage* 6 (4): 1–15. doi:10.1145/2532630.2532632.