# The Unbearable Complexity of Documenting Intellectual Processes
## Paradata and Virtual Cultural Heritage Visualisation

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Bentkowska-Kafel, Anna, Hugh Denard & Drew Baker, eds. (2012). *Paradata and Transparency in Virtual Heritage.* (290 p.). (Digital Research in the Arts and Humanities). Farnham: Ashgate. ISBN 978-0-7546-7583-9.

What should be known about the past is a difficult question. An even more complex question is to decide what should be known about the things that remind and inform us of the past. The ideas of the description, documentation and intellectual organisation of the past have changed when the ideas of the past and its meaning have changed. The appreciation of the relics of the past as curiosities, instruments of the legitimation of power, evidence of "wie es eigentlich gewesen" or as the building blocks of a national identity have very different implications for what is desirable and necessary to know and to document. One of the central underpinnings of the contemporary idea of heritage as past in the present, or as an "essentialised resource for 'creating a future'" (Butler 2009) has had a similarly significant impact on the understanding of what needs to be documented and how.

A large part of scholarly and professional attention has focused on how to document heritage objects and how to describe their material and

immaterial properties. There are numerous standards for describing col-
ours, materials, ownership and even uses of heritage artefacts. Similar
close attention has been paid to how to represent, visualise and exhibit
the artefacts and their cultural and historic contexts. In contrast, there
has been considerably less discussion on how to document the intellec-
tual processes of coming to particular conclusions *about* heritage objects.

The volume *Paradata and Transparency in Virtual Heritage* edited by
Anna Bentkowska-Kafel, Hugh Denard and Drew Baker (2012) addresses
this particular under-studied issue. The notion of paradata is defined as

> *information about human processes of understanding and interpreta-
> tion of data objects. Examples of paradata include descriptions stored
> within a structured dataset of how evidence was used to interpret an
> artefact, or a comment on methodological premises within a research
> publication. It is closely related, but somewhat different in emphasis,
> to "contextual metadata", which tend to communicate interpretations
> of an artefact or collection, rather than the process through which one
> or more artefacts were processed or interpreted.* (Bentkowska-Kafel,
> Denard & Baker 2012, 7, from The London Charter version 2.1)

In short, the term connotes information about the processes through
which people have understood and interpreted "data objects", including
cultural heritage artefacts, structures, environments and different forms
of relevant data.

The origins of the ongoing paradata discussion date back to the
1990s, and to a certain extent also to earlier discussions on the represen-
tation of heritage. For instance, Adkins and Adkins discuss many of the
issues relating to paradata in their 1989 volume on archaeological il-
lustration (Adkins & Adkins 1989), i.e., illustration using primarily pen
and paper and other non-digital means for representing the past. Later
on in the 1990s, the cultural heritage professionals and scholars began
to express increasingly critical comments on the prevailing technology-

driven practices of computer based heritage visualisations (Durand 2002; Roussou & Drettakis 2004). At the turn of the millennium, different methods of non-photorealistic rendering (Klein *et al.* 2000) were proposed as a remedy to the challenge of communicating uncertainties and the different phases of the process of interpretation that were often impossible to discern in a photo-realistic rendering of a heritage artefact or historic landscape. Since then, the discussion on heritage paradata has continued and several authors including Forte (e.g., Forte 2010; Forte & Kurillo 2010; Forte & Pescarin 2007), Niccolucci (Niccolucci & Cantone 2003) and Hermon (e.g., Hermon & Kalisperis 2011) have proposed various approaches to address the challenge of representing the process of interpretation. But in spite of the temptation to suggest that the methods and theoretical discussion of heritage paradata would have progressed significantly during the last decade, the advances have been relatively few. The London Charter is a significant step on the level of establishing principles and acknowledging the significance of paradata, but as the contributing authors in the *Paradata and Transparency in Virtual Heritage* anthology underline, the charter needs to be complemented with practical guidelines and techniques to realise its potential. At this point it is fair to admit that this applies also to my own contributions to the discussion in form of a series of texts on the need to document visualisations not in text, but by using an approach and media that would be closer to the visualisation itself (Vatanen 2003); on the use of argumentation theory as a theoretical basis for describing different interpretative decisions (Vatanen 2004a; 2004b); on discrepancies between the professional and public needs of information (Vatanen, Lehtonen & Uotila 2005); on the challenges of educating archaeologists in the critical use of digital technologies (Uotila & Huvila 2006); and, for instance, on developing archaeology oriented archaeological documentation (Huvila 2009; 2012).

Paradata is a broad phenomenon and relevant to the whole spectrum of cultural heritage work. The focus of the volume *Paradata and Transparency*

*in Virtual Heritage* is, however, somewhat narrower even if the discussion is highly relevant even outside its principal scope. The anthology sets out to discuss digital visualisations of heritage, and it springs from the work of a cooperative undertaking for establishing guidelines and principles for the documentation of computer-based visualisation. This work resulted in the publication of the first draft of the so called London Charter in 2006 and the subsequent issuing of its first official version 2.1 in 2009. Several of the contributions in the anthology were also originally presented in London at the *Making 3D Research Outcomes Transparent* seminar in February 2006, which also marked the starting point for the process of writing the charter document. Considering its origins and the contents of the contributions in the volume, it is impossible to avoid the impression that one of the major aims of *Paradata and Transparency in Virtual Heritage* has been to publicise the charter.

The topic of the book is as timely as it ever can be, but a slight shortcoming with the contents of the volume is that even if the authors have updated their papers after the seminar in 2006 to reflect the situation around (apparently) 2009 when the most recent version of the London Charter was published, many of the chapters are based on work conducted almost a decade ago in the early 2000s and before. The age of some of the contributions shows especially in the descriptions of the state-of-the-art technologies and technical challenges of documentation in legacy environments but otherwise, and perhaps somewhat unfortunately, many of the questions addressed in the book are still under debate. At the same time, the retrospective nature of the volume makes it an excellent historical account of the development of heritage visualisation from the early 1990s to the mid-2000s. It helps readers understand the background of the London Charter, and as such, it deserves to end up on the reading lists of cultural heritage professionals and scholars. I especially appreciated the chapter by virtual archaeology pioneer Donald Sanders for its value as an account of the state-of-the-art in the 1990s. At the same time, the current volume leaves room for a companion volume that would present

an overview of the current state-of-the-art in the paradata research and practice in the context of contemporary standards and technologies.

Besides the age of the contributions, the volume also warrants some critique for lacking overall coherence. The typical remark on the difficulty of writing a consistent edited volume applies also to *Paradata and Transparency in Virtual Heritage*. Sometimes, however, the (luckily often rather moderate) inconsistencies and repetitions even deserve some credit for helping to shed light on things from complementary points of view. At other times, as for instance when both Niccolucci and Hermon describe in some detail the same pilot study in two different chapters, it is obvious that a slightly more thorough coordination between the individual authors would have benefitted the end result. The introduction to the anthology is rather short, but the concluding chapter provides a good summary of some of its major themes by briefly discussing heritage visualisation as research method, as reconstruction, as experience and as method for the diffusion of knowledge.

My final more general observation on the volume relates to its theoretical underpinnings. Similar to the paradata literature as a whole, many of the chapters in the book make references to theoretical literature and posit interesting ideas on the premises and implications of different approaches to conceptualisations of paradata and of the human processes of understanding and interpreting heritage. At the same time, it seems that the theoretical considerations tend to be related to a rather unspecific articulation of complexity or to specific practical issues. Only a few authors make attempts to use theory in a comprehensive non-anecdotal manner to provide a unified framework for both. I am somewhat inclined to suggest that many of the contributions as well as the paradata discussion in general, might benefit from a more explicit articulation of theoretical premises. In spite of the praiseworthy theoretical insights presented in the here reviewed volume, paradata is mostly portrayed as a complex but still primarily technical, rather than theoretical, issue.

The anthology starts with a series of short chapters on various general topics loosely related to the theme of part one titled "Conventions and Emerging Standards". Beacham presents some almost poetic remarks on the terminology of the book and the London Chapter. In the following chapter, Hermon discusses briefly the relation between scientific method and visualisation illustrating his point of view by referring to a case study of the visualisation of the mausoleum of Lars Porsenna on the basis of the written account of Pliny the Elder (based on the earlier account of Varro). Niccolucci presents an interesting and rather comprehensive overview of a selection of noteworthy initiatives to develop standards for the documentation of 3D visualisations. He lists major milestones including the CVRO (Cultural Virtual Reality Organization) manifesto from 2002 (Frischer *et al.* 2002), the work in Ename (e.g., Pletinckx, Silberman & Callebaut 2001), Tübingen (the TroiaVR project, e.g., Jablonka, Kirchner & Serangeli 2003) and Prato (e.g., Cantone 2002). This chapter is followed by a long chapter by Sanders, primarily on his own work in the field of virtual heritage, and an informative commentary on the London Charter by Denard together with the current (as of June 2012) version 2.1. of the text of the charter from February 2009.

Part two of the book discusses methods and tools for data interpretation in refreshingly diverse contexts of heritage. The first contribution of Carnall presents a critical analysis of the representation of natural environment in computer graphics based documentaries (mainly the BBC series *Walking with Dinosaurs* and the National Geographic production *Sea Monsters: A Prehistoric Adventure*). At the end of the chapter Carnall suggests that such tools as Second Life, Spore, Foldit or (Google) Sketchup could provide "everyone" with the possibility to experiment and "draw their own conclusions about palaeontological reconstructions" as well as to contribute to "scientific research" (93). This is an interesting proposal considering the experiences of the use of Second Life in archaeology, for instance in Stanford (e.g., Morgan 2009), even if some caution is necessary considering the findings of Clark (2011) on the strong tendency of

Second Life users to reproduce natural stereotypes rather than to experiment with the displays of 'real' nature. In the next chapter, Jones describes the process of creating a virtual model of the late medieval Southampton on the basis of a small number of cartographic, archival and archaeological evidence, and the communication of various levels of certainty in the resulting model. The chapter opens up many of the problems and interpretative processes pertaining to the modelling of complete urban landscapes which, in spite of their significance, are rarely discussed in similar comprehensive manners in the literature. In the following chapter, Egel-Andrews discusses the use of visualisations in the context of art history and shows how the anthology chapter itself can essentially function as a complicated and rich instance of paradata for a visualisation of an artist's studio. Devlin discusses in similar detail the problematic nature of lighting and its impact on the 'realism' of visualisations. She remarks aptly that even if the modellers of heritage objects and spaces would emphasise geometric accuracy of the model, the lighting is often designed to appeal to the eye of the beholder rather than to accurately represent the physical qualities of 'real' sources of light. In chapter 12, Turner touches upon some premisory physiological issues relating to metadata and paradata in the context of computer visualisations and presents briefly some UK-based visualisation related initiatives. In a following chapter, Havemann discusses the intricacies of shape description. 3D visualisations can be based on acquired data (e.g. scanning) or they can be synthetic (i.e. based on educated guesses and only a limited amount of acquired data). The difference between the two approaches goes back to a philosophical question of the existence of a round arch (as Havemann puts it) and other 'perfect' objects. The question itself is perhaps less interesting than its consequences for how and what that is necessary to document of the remains of an arch. Havemann posits that the important thing about an arch is that it has been an arch while some others, including van Gool, have argued for the necessity of a detailed documentation of the actual remains and warned against making

premature interpretations. As Havemann acknowledges, the two stand-points represent possible user queries and hence, premises for the documentation of 3D visualisations.

Part 3 of the book discusses data management and communication. In the first chapter, Baker returns to the question of the nature of paradata and some related concepts. She discusses the intricacies of paradata using an example of how a relatively simple and seemingly unequivocal narrative can lead to very different visualisations depending on the assumptions made in the process. She continues by discussing the definition of paradata and fundamental issues relating to 'data metamorphosis', i.e., how combinations and associations of information lead to transformation rather than accumulation of knowledge. The discussion is enlightening, but as a slightly critical remark from an information science perspective, it would have benefitted from considering a broader array of information related theorising than the debated (e.g., Rowley 2007; Bernstein 2009) Data, Information, Knowledge, Wisdom (DIKW) model of Ackoff (1989). The following chapter by Mudge discusses the transparency of empirical data and presents useful suggestions for the use of standards, the possibility of using lab notebooks in documentation (similar to the ones used frequently in sciences), and semantic knowledge management technologies. He also notes the emerging benefits of the democratisation of technology for the cultural heritage professionals. With better and less complicated technologies there will be more time to focus on the substance instead of the instruments. The next chapter by Forte and Pescarin looks into a series of Italian projects and articulates their premises from a Batesonian point of view with an emphasis on cybernetics, multimodal accessibility, interaction and user feedback. In contrast to theoretical discussions on practice, the focus of Pletinckx in chapter 17 is on a walkthrough of the EPOCH Common Infrastructure Tool for Interpretation Management together with a brief discussion of some related approaches for the documentation of an interpretative process. The EPOCH tool provides a comprehensive framework for explicating

interpretative processes and functions as a good starting point for both practical and theoretical discussions on the capturing and recording of paradata. The main challenges of using the tool in practice could be argued to be related to its complexity and somewhat managerial and schematic underpinnings that may be difficult to unite with the often rather hermeneutic processes of computer visualisations of heritage. This does not, of course, decrease the value of the tool as a point of reference.

In spite of a few critical remarks, thus, the anthology as a whole has merit. It does not give definite answers to the problems of producing and using paradata, but the lack of answers reflects the current state-of-the-art of paradata research and practice rather than the qualities of this volume. To quote myself in 2006, it is still obvious that

> *[t]he sources and the process of reasoning behind all 'constructed' information, needs to be clearly indicated. It is important to communicate whether a piece of information is acquired by measuring or by hypothetical deductions, but it is equally significant to explicate the methods and bases of the measurements and hypotheses.* (Huvila 2006, 294)

Meanwhile, *Paradata and Transparency in Virtual Heritage* serves well as a useful compendium that brings together different issues and challenges related to paradata and heritage visualisations and at the same time, as a reminder that we are still lacking many practical and perhaps especially theoretical instruments to realise the stated aim of paradata; to make transparent "the human processes of understanding and interpretation of data objects" in practice.

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