

Negotiating 'Culture', Assembling a Past



Negotiating 'culture', assembling a past
the visual, the non-visual and the voice of the silent actant

Jonathan Westin



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Cover: Forum Romanum, a view from the portico of Basilica Aemilia,
winter 754 *ab urbe condita*... and viral vectors! Illustration by Jonathan Westin,
with scholarly assistance from Ragnar Hedlund.

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Abstract

The aim of this thesis is to describe and analyse the processes surrounding the creation of a scientific visual representation, where, both in the practical creation of this visualisation and in the way it is communicated, those actants which amount to what we call 'culture' or cultural value, are enrolled or ignored. Trying to answer if a broader set of non-visual cultural properties can be identified and their influence described, and if history can be visualised without displacing our knowledge of the past in favour of a popular representation thereof, I trace the interaction between client, artist, technology and target audience.

Although the audience is not permitted to take part in the meetings and walk the floors of the studios, and thus seem to remain silent, I argue nonetheless that their voices *are* heard during the assembling of a visual representation. Furthermore, offering the audience a tool is not enough to entice them to form their own ideas and exercise influence: although often presented as a visitor-empowering pedagogic technique which invites different interpretations of the material at display, the interactive technology offered by museums and educators is a tool of con-

formity which disciplines the audience and must therefore be treated as such.

An object is not an entity which can be separated into artefact and context, but a hybrid made up of associations spread over both space and time. To describe this, and capture how visual representations can represent 'culture', I have developed an analytical vocabulary where the absolute limitations of an artefact or phenomenon is the point of departure. As the vocabulary of limitations demonstrates, limitations constitute the borders of an expression and permit an explanation of how associated actants are shaped by these borders into what we have come to refer to as 'culture'.

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List of Papers

This doctoral thesis is based on seven articles, referred to in the summary as article 1 through 7.

ARTICLE 1: Frizell, Santillo B. and Westin, J., 2009. "Displaying Via Tecta: Visualisation and Communication". In: H. Bjur and B. Frizell, Santillo (eds.) *Via Tiburtina. Space, Movement and Artefacts in the Urban Landscape*. Motala: Swedish Institute of Classical Studies in Rome, 219-230.

ARTICLE 2: Westin, J. and Eriksson, T., 2010. "Imaging the Sanctuary of Hercules Victor". In: F. Bernardini and D. Santarsiero (eds.) *Archeomatica* (2), 2010: 58-62.

ARTICLE 3: Westin, J., 2009. "Interactivity, Activity and Reactivity: Thoughts on Creating a Digital Sphere for an Analogue Body". *ED-MEDIA 2009 Proceedings*, 2009: 814-819.

ARTICLE 4: Westin, J., 2011. "The Interactive Museum and its Non-Human Actants". In: E. Silvén (ed.) *The Journal of Nordic Museology* (1), 2011: 45-59.

ARTICLE 5: Westin, J., 2012. "Towards a Vocabulary of Limitations: the Translation of a Painted Goddess into a Symbol of Classical Education". In: L. Smith (ed.) *The International Journal of Heritage Studies* (1), 2012: 18-32.

ARTICLE 6: Westin, J., 2012. "Loss of Culture: the Lady and the Fox". In: J. Knight and A. Weedon (eds.) *Convergence: the International Journal of Research into New Media Technologies*, 2012.

ARTICLE 7: Westin, J., 2012. "Inking a Past". *Forthcoming*.

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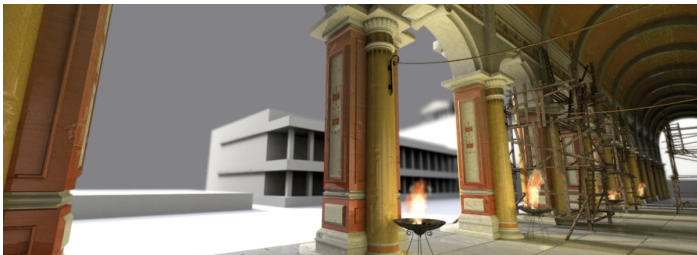
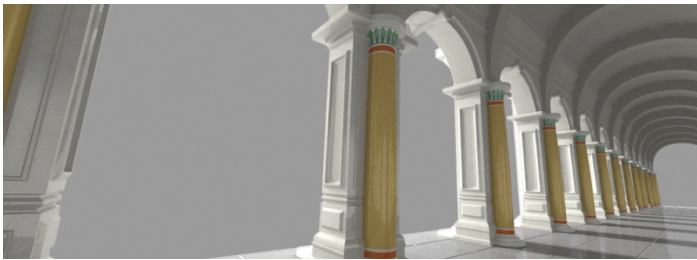
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Foreword

Having worked for more than fifteen years with visual representations, I have acquired an interest in the practical reality of image-making, and what governs the processes behind it. My work experience ranges from archaeological visualisations of Etruscan mirrors, sanctuaries, villages and landscapes to comic book superheroes, safety-on-board manuals, posters for concerts and diplomas for international artists, music videos and medical visualisations. Within the field of interactive learning, I have worked on graphics and programming of computer games, both of my own making and as part of a ‘modding’ process, interactive 3d-tours of museums and their collections, as well as medical diagnosis systems to test early hints of cognitive deterioration. My visualisations have been represented in many of the major newspapers of the world. This does not suggest that my take on

representations and interactivity is automatically ‘correct’, but it does lend me an insight into procedures that often escape a researcher only observing, not doing.

As the title suggests, negotiations will play a major role in those interactions that end up in what we call ‘culture’ and in the assemblage we call ‘the past’, but it is more often a negotiation between humans and non-humans, between ideas and the limitations present in the execution of those ideas – limitations both constructed and absolute – than a negotiation between sentient beings. Consider a painting. The end result first imagined by the client, has had to pass through a series of negotiation processes between client, artist, materials, available tools and audiences before being translated into a hybrid mediated by all these actants. The representation of Forum Romanum in the mind

of the client – rich in colour, life and grit – has been translated through many eyes to be realised through the limitations of those signifiers available to the artist, the tools at hand and the restraints of a two dimensional canvas.

Acknowledgements

It would have proven impossible to write this thesis without the guidance and encouragement of my supervisors, prof. Hans Bjur and prof. Barbro Santillo Frizell, who instigated this whole endeavour by inviting me to participate in the Via Tiburtina project, and then talked me into investing five years as a PhD-student. This whole project at an end, I hope they consider me a friend as much as I so consider them. I would also like to take the opportunity to publicly offer my sincere gratitude to Stefania Renzetti at the Swedish Institute in Rome for helping me establish a contact with Inklinc Firenze, Francesco Petracchi for being that contact and dr. Karin Westin Tikkanen for acting interpreter and assistant (and much more important: being an extraordinary wife!). I would also like to thank Astrid Capoferro and Liv d'Amelio, for helping me with everything library and bar related, and Margareta Ohlson Lepsky for always finding me a room at the Swedish Institute in Rome.

There has been a host of helpful friends and scholars commenting on my texts, and I have done my very best to credit them all on the 'fact-sheets' leading up to each article. However, dr. Ragnar Hedlund and doc. Martin Gren deserve a special mention, as they repeatedly gave me solid feedback on my drafts. Ragnar was also of great assistance when I worked on the visual representation of Forum Romanum.

All my past and present colleagues at the Department of conservation: it has been fun. I hope some

of you will find your workdays so much more boring with me not being there anymore (or in the case of Laila and Agneta: that much easier!). Ulrich: our lunches and discussions were the high-point of every week. Ola and Ingrid: you made me feel welcome at a department I had never heard of before, but that I now consider the very best of places to work.

I am not always easy to be around, so I guess I owe quite a few people a special mention for offering moral support even when I didn't deserve it, or for suffering through my peculiarities. However, such a list could never be complete, so I will narrow it down to Karin and Hannah. And Sam and Sparky.

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On the cover

For the prologue of this thesis, I tried to assemble a visual representation of Forum Romanum in the winter of year 1 (754 *ab urbe condita*), using available research and documentation on architecture, colours and movements. Without shying away from uncertainties, the aim was to forgo the established visual signifiers of that time period, and present a *plausible* visualisation rather than a *pleasing* one. The cover image is a processed rendition of this illustration, with the addition of four red hexagons symbolising viral vectors. These were modelled

and rendered in Strata Studio 3D CX7, and then brought into Adobe Photoshop CS3 where I incorporated them into the Forum composition using the mask tool.

To lend the representation the look of a classic painting, and thus enrol a different set of properties, I started out by reducing the number of colours in the image, grouping similar nuances into facets. These facets were then traced using a Wacom tablet and a series of five different brush-shapes at eight different sizes. Through this technique, by matching the size and nuance of every facet with either a brush stroke or by just dipping the tip of the pen into the centre of the facet, I translated the 3d-rendered image into something more akin to a traditional painting.

To add texture to this painting, and enhance the illusion, I took the brush strokes, separated into layers, and created a grey-scale bump-map which I imported into Strata Studio. In Strata, I created a texture combining this bump-map with a colour-map derived from the colour composition, and applied it to a polygon serving as a digital canvas. Rendered, the bump-map functioned to bring out each stroke's thickness.

The result was then brought back into Photoshop, mounted on top of a layer containing the photograph of a hand-made paper. Setting the forum-layer's blend mode to "Darken", I let it project itself on the rough texture below. I then divided the composition into eight parts and imported these into Procreate on an iPad, where I traced some of the lines with a custom brush to bring out various shapes and figures. Finally I imported the parts back into Photoshop and assembled them.

Funding

The National Heritage Board (Riksantikvarieämbetet) contributed with funding for a significant part of this thesis.

A scholarship from The Swedish Institute in Rome allowed me to conduct my research in Rome, Italy, for ten months 2009-2010.

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Gothenburg, August 2012

Jonathan Westin

Title: Summary: Negotiating 'Culture', Assembling a Past:
the Visual, the Non-Visual and the Voice of the Silent Actant.

Persons who commented on advanced drafts of this summary:

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Summary: Negotiating ‘Culture’, Assembling a Past

Prologue

SCENE 1: An impossible present or a hypothetical future. A visitor walks through a vast virtual reconstruction of ancient Rome. Although set in the Augustean era, it is still a *new* Antiquity put on display – an Antiquity teeming with colour and life. Gone are the dusty white friezes of earlier reconstructions, replaced by ones rendered in vivid colours, bringing the motifs to life in ways the visitor never would have imagined. The temples and basilicas, decorated with murals and intricate details in cast bronze, compete in richness of colour with the rough fabrics which drape the walls of the galleries. Even the statues are painted and shrouded in flowing textiles, bringing to mind gigantic gods striding the streets of the eternal city.

To the visitor, the reconstruction seems to be perfect. Executed in a pedagogic manner, it goes to great lengths establishing its numerous connec-

tions with archaeological evidence and the realities of time. With genuine surprise, the visitor notices that the researchers have introduced decay into the reconstruction, making it even more nuanced and alive – some of the buildings are distinctly more weathered than others. The dirt-streaked colours of Aedes Vestae on the Forum Romanum are fainter than those of the nearby and more recently rebuilt Basilica Aemilia, and a couple of roof tiles on Basilica Iulia are missing, others ajar, as if a storm had recently passed by leaving its mark on the city landscape (fig. 1).

Everywhere there are signs of life, suggesting that the digital inhabitants of the reconstruction have truly appropriated the space. Colourful canopies extend the protection of the galleries and at the far end of the forum, towards the Capitoline Hill, scaffolds have been erected, alive with the noise



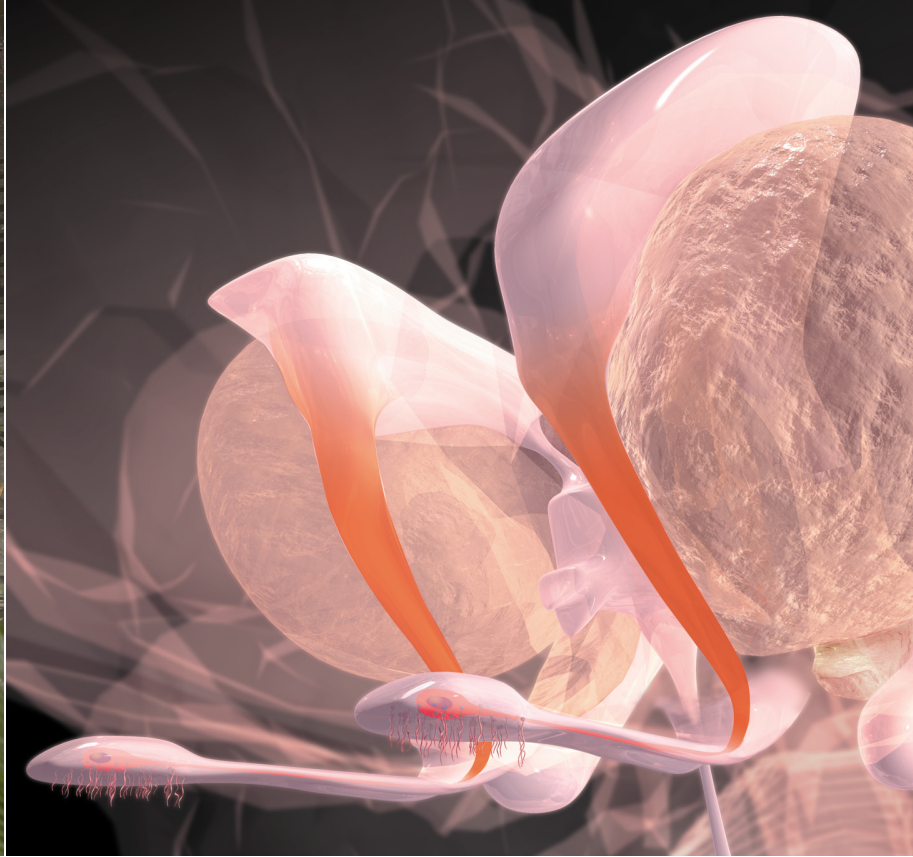
Fig. 1. **Forum.**
View from Basilica Aemilia,
winter 754 *ab urbe condita*.

and movements of workers manoeuvring a wooden crane loaded with heavy blocks of tufa rock. Birds are feasting loudly on the left-overs from a dinner while thick, oily smoke rises from the braziers of several makeshift market stalls and mixes with the black smoke of a sacrificial altar. A winter storm is brewing and a family of three, plebeians but well-off, are throwing anxious glances at the sky as they hurriedly prepare to leave the warmth of the portico braziers for their home on the Aventine Hill. A junior official, the only one on the forum wearing a toga, surrounded by his few and freezing clients in front of the temple of Divus Iulius, fails to make his nasal voice heard over the din of a group of incompetent pipers.

Even the undesirable elements of society have found their way to the forum today. A fight seems to take place at the small temple of Janus above the Cloaca Maxima – a sandal is raised and another

is dropped. Someone who is noticeably confused, sick or just drunk, leans heavily against the Rostra as if to collect himself and is mocked by a gang of youngsters he would never be able to catch. His body sags to the ground as a pack of barking dogs chase a cat past him through a cloud of dead leaves and insects.

The visitor smiles inwardly. The reconstruction *is* alive and, admittedly, it is thought-provoking, but in all this a little *too* fanciful. The colour scheme does not match the taste the visitor associates with Antiquity and some elements, especially the inhabitants, seem to be more at home in the Middle Ages. In addition, much of the architecture is covered by structures that do not belong in the Roman era, such as the overloaded market stalls, garish canopies and wooden balustrades. The classic lines appear to have been lost and with them the classic ideals. Order has given way to chaos



through these modifications of the space. The visitor knows the design of the Forum Romanum well through Platner-Ashby – a clear sequence of relationships between space and monuments. However, troubling enough, this reconstruction fails to convey these relationships. The virtual model, part of a temporary exhibition, shuts down three months later after selected parts of it have been documented on a lithograph...

SCENE 2: A past. In a small neuro-research laboratory in Gothenburg, a group of researchers discovered an intriguing interlink on the cellular level, through the rostral migratory stream (RMS), between the olfactory bulbs and the ventricular system, adjoining the hippocampal area in the brain. This is not a link visible to the naked eye, it can only be spotted by studying how marked out cells travel under certain conditions. To communicate these findings in a comprehensible way, the

researchers produced a series of visual representations of the cell-migration process. These representations, in the form of 3d-models and rendered still images, were at first, during research, only of internal use, but would later function both as illustrations in scientific publications as well as press material intended for communication with the general public.

The area that needed to be represented, part of the scientists' day-to-day reality, was, despite physical in nature, very indistinct. It consisted of soft tissue, cavities and fluid. Therefore, ever-changing in its composition, it did not lend itself to a straightforward depiction. It could not be an unmediated translation from physicality to representation. Even though the many intricacies of the ventricular system is a physical reality within the grasp of the researchers' instruments, in order to create a visual representation of it that could be recognised

Fig. 2. **Science.**
Cover image on Science
Magazine, 2 March 2007.

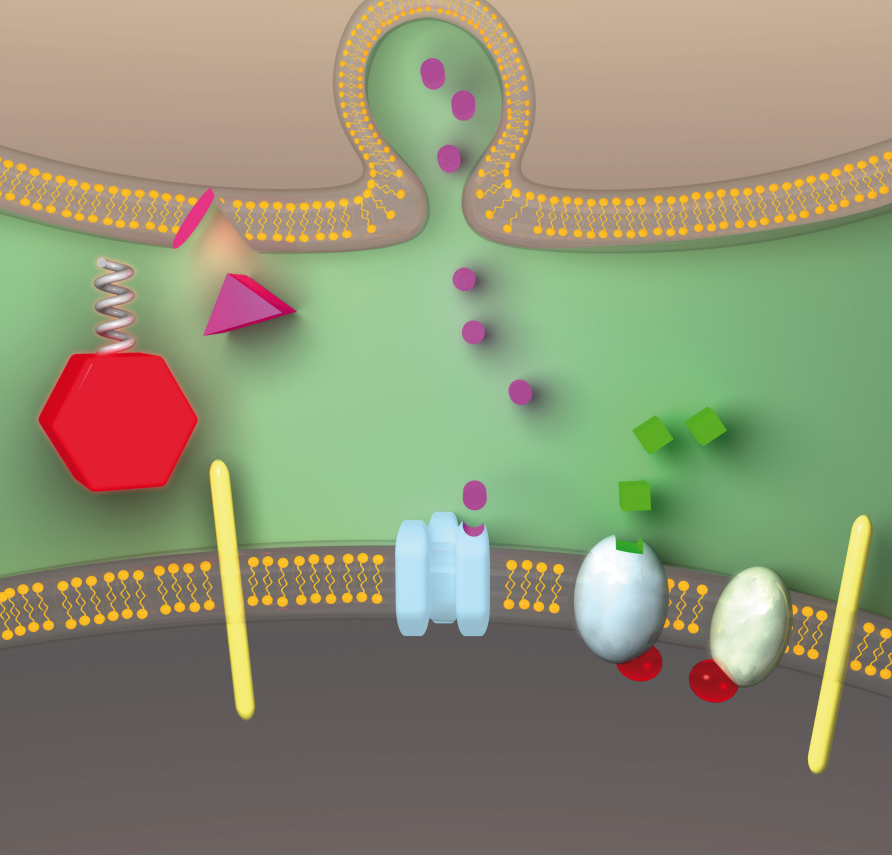


Fig. 3. **Hexagon.** A body of apolitical parts forming a whole, or a game of “Spot the viral vector”.

for what it was, thus aiding the communication, the artist had to turn to earlier, stylised, descriptions of the area and let the infinite complex model of their reality be influenced by these simplified descriptions.

The result, a 3d-model from which a series of images were rendered, was therefore neither a faithful reproduction of the brains kept in the cold storage and freeze-dried glass slides of the laboratory, nor a simple reproduction of earlier visualisations. Not true to the reality of the researchers, but instead perfected visual representations of the ventricular system made symmetrical and tangible through the stylised conventions of earlier descriptions, these new images performed nonetheless their designated function, since an effective focus had been added. The important areas were enhanced, while the unimportant parts were left without detail, and visual signifiers were used to communicate

things that could not be seen, such as the path the cells travelled within the RMS. The visualisation’s objective was to communicate the research of the scientists, not reality. Following a submission process, the research was made cover story on *Science Magazine* (Curtis *et al* 2007a), where one of the visual representations was chosen as cover image (fig. 2). The other images were made available to the international press, and within two weeks they had been featured in many of the major newspapers in the world.

In a follow-up review article in *Nature Magazine* (Curtis *et al* 2007b) on the effects of neurodegenerative diseases on the subventricular zone (SVZ), the researchers once again had to abandon reality for a representation thereof. Being a continuation of the research in the *Science Magazine* article, the previous model was re-used in two of the new images as a point-of-reference since it was now an es-

established visual representation of the area, not at all as indistinct and formless it had appeared just half a year earlier. On top of this model, additional details were added. The complicated process of delivering a viral vector, transcription factors and mitogenic compounds into the lateral ventricle demanded a representation that made all these actants unique to the eye of the reader (fig. 3). Of note is the viral vector, represented by an alarmingly red hexagon against the soft green of the SVZ. From the hexagon protrudes a grey-blue spiral, reminiscent of a metallic corkscrew...

Introduction

“The methodological tradition which we inherit has almost always separated the realm of fieldwork, reports, and publications from the realm of cultural communication, which is too often popularised and marginalised under the vague term ‘didactic’” (Forte 2008, p. 23).

Through what techniques of visual representation is the past upheld? All scientific work has a communicative aspect, where thought and theory are shrouded in visual form. Be it white marble or red hexagons, visual communication has a rich archive of symbols to draw from which *serves* the interchange, if not always the accuracy of the research. Not least so when cultural properties are solidified through elaborate acts of *re-presentations*, *re-constructions* or *de-scriptions*, as is so often the case when we are trying to grip a past or document the present. Though visual communication is a formative process influenced by the techniques and symbols involved in the practical representation procedures, the translations these procedures bring about are seldom considered to shape both scholarly and popular visualisations alike. As a consequence, *despite* the fact that their impact is not confined to the popular dimensions of communication, the workings of these procedures have

traditionally been relegated to be a question of non-academic character (Moser 2001, p. 263; Moser 2008; Carman and Sørensen 2009, p. 18).

Being a trained classical archaeologist myself, and also an active illustrator who has worked professionally for more than a decade with techniques of visual representation – in both traditional and interactive media – I am at an advantage discussing the ways in which history is formalised through visualisations. The aim of this thesis is to use the experience gained in my two professions, to render the construction of a historic visualisation less opaque. This in an effort to describe how those practical procedures involved are mediated by – and at the same time also (re-)construct and reinforce – what is often referred to as the ‘culture’ of the artefact, phenomenon or event visualised.

Though archaeologists and historians strive to communicate their research in an as unmediated manner as possible, this process is often complicated by the researched subject’s socio-cultural associations. The nature of this complication, which occurs when knowledge is translated into an inscription in the form of a visual representation, is here approached through a series of overlapping inquiries: *in what way does ‘culture’ mediate a visual representation, and can a broader set of non-visual cultural properties be identified and their influence described? Can we create representations of artefacts, phenomena and events in a way that encompasses these properties, and can history be visualised without displacing our knowledge of the past in favour of a popular representation thereof?* These are urgent inquiries to investigate from a perspective of heritage studies, since a growing part of our cultural heritage is communicated through various techniques of visual representation and is therefore mediated through processes which stabilise or lose socio-cultural associations.

Naturally, a study such as this, where visual representations of history and ‘culture’ are treated, does often take an interest in the political nature of the subject (see Moser 1998, p. 144ff; Privateer 2005). Arguing that human-origin narratives “continuously strengthen dominant cultural ideas” (*ibid.*, p. 22), Privateer writes that the “ideas of any age or culture gain or lose supremacy by either merging or not merging with other ideas” (*ibid.*).

Indeed, visual representations of history and ‘culture’ are often the tools of politics and ideologies, making up identity and nationality (see Tunbridge and Ashworth 1996; Ashworth *et al* 2007). However, although political, scientific and artistic interests can be the architects of new visual representations, these interests are more often informed by the representations at hand (article 7). Thus, the *goals* are shaped by *the tools*, since these goals make use of the inherent properties of already established visual concepts to further their argumentation. Therefore, the procedures studied in this thesis are not marked by inventiveness as much as a highly developed perceptivity, being a process which decides how already established building-blocks are to be assembled into an *inscription* able to communicate with the recipient. In my use, an inscription is the material outcome of a process, given form through visual signs representing said process. Hence, rather than the *process itself*, it is often the *inscription* that functions as a stepping stone for other processes and actants, as the inscription is the process made mobile (Latour and Woolgar 1979, p. 66). As such, an inscription is both a product and a means of productivity (article 7).

I have found visual representations and cultural properties to be negotiated – tried and confirmed or abandoned – in the *practical implementations* of communication, where these inscriptions are cre-

ated. Focus is therefore shifted from ideologies and politics, truth and facts, into the conservation laboratories and visualisation studios whose micro-decisions do all the difference and where the various properties of artefacts, phenomena and events are measured, preserved and discarded daily. On that account, my choice of method and theoretical framework can be seen as a consequence of this focus.

As an inscription reflects a process, not the other way around, all visual representations are inscriptions, but not all inscriptions are visual representations. Hence, a visualisation is not bound by the rules that a scientific measuring – also an inscription – has to adhere to, where the goal is to transfer visual characteristics of a physical object in its present state to a movable media as faithfully as possible (see Almevik 2012, p. 77). Neither is a visualisation limited to physical remains, or even a strictly denotative visual grammar, but free to describe a scene using a large set of tools to communicate a wider spectrum of information. Rose refers to representations as “made meanings” (2006, p. 2), a definition which suggests that to make a visual representation is to present something with intensive force, not solely to mimic or try to present the same thing anew. As a consequence, all visual representations are *argued* representations, originating in a *rhetor*. In my use, the rhetor is the instigator of a message, and as such it can be a producer, a scholar, or even an artefact as it appears in a certain context. This inclusion of non-human actants broadens the definition put forth by Kress (2010, p. 42).

Though I assign no greater difference between visual representation and reconstruction, the latter is, in my use, primarily a tool to connect an audience with a physicality, provoking a new emo-

tional response. In other words, one can create a visual *representation* of both a scene and the emotions of those partaking in the scene, but one cannot create a *reconstruction* of their emotions, only, through the reconstruction, try to incite a similar emotional response within the audience.

An understanding of the processes that make up those symbols through which we communicate historic artefacts, phenomena and events is crucial, since visual representations are often located in the junction between the researcher and the public. Positioned in such a way, the communicative conventions these visualisations make use of make up a large part of the public's apprehension of the past, all the while – as this thesis argues – they limit the scholars' ability to express new results in an unmediated way. Indeed, the past is what we *collectively* represent it to be. Furthermore, addressing the relevance to heritage studies, I argue that, although there is a well researched tendency to attach qualities to the construct of these inscriptions, and to the context of the presentation, rather than to the artefact or phenomenon itself (see Grahn 2004; Knudsen and Waade 2010, p. 8), the genesis, for lack of a better word, of this attachment has not been thoroughly studied. Consequently, a proper comprehension of how these qualities are formed and stabilised around an artefact through what I have come to refer to as *currents* – or 'soft actants' – is decisive when evaluating how to best represent both tangible and intangible heritage (article 5 and 6).

On 'culture' and secondary sources

Of importance for this thesis and reflected in the way I approach my field of inquiry, is what meaning I assign to 'culture' and *cultural heritage*. Just as the term *power* has become a telling sign of "intellectual laziness", so has 'culture' (Harman 2009, p. 27, paraphrasing Latour 1988, p. 175). The apostro-

phes framing 'culture' in the title of this thesis, and all through the text, are put there as a reminder that this word is no more than a placeholder for an active process and not a definition. A typographic equivalent of *hic sunt dracones*, if you will.

Following the often quoted notion of actor-network theory (hereafter ANT) that nature is the consequence, not the cause, of settlements (Latour 1987, p. 99, 258), this dissertation does not approach 'culture' as a start or undisputed result, but as a network of associations in constant formation. As such, 'culture' takes the form of a very active negotiation process between all actants making up its construction (article 5 and 6). This implies that there can be no definite visual representation or description, encompassing the entirety of this construction. There are always new perspectives, changing alliances and neglected stakeholders to take into account, growing and challenging our grasp of 'culture'. Therefore, this study does not profess to describe 'culture', but rather those processes that are put in motion when what is commonly called 'culture' is communicated and inscribed into visual representations. 'Culture', as a word, remains a white space until its construction is revealed, but its dragons can only be temporarily expelled.

Furthermore, I treat *cultural heritage* as a demarcated part of 'culture', so my approach towards the latter applies also to the former. However, being a defined part of 'culture', cultural heritage has the additional complexity of already being a representation, since it is a consciously interpreted and presented unit of 'culture'. As such, it could be described as a set of values and understandings, not merely places, old monuments and artefacts (see Smith 2006, p. 11). With an added discourse concerning questions of *who's* heritage, cultural herit-

age, as a concept, clearly comes with baggage (see Landzelius 2003 on disinheritance and Morrissey 2006 on dissonant heritage). As Smith writes:

“[While] heritage is shown to be an affirmation of identity and a sense of belonging, that identity may also nonetheless be one that is governed by wider social forces and narratives” (2006, p. 7).

This study of the procedures of making visual representations, is of relevance for the ongoing digitisation and modelling of those artefacts, phenomena and events considered to be of historic interest. The consequence of the rich documentation made available is an increasing consultation of *secondary sources* – representations of the *primary sources* – a development which puts pressure on what aspects and properties of the artefacts, phenomena and events we preserve through both new and old media (see article 1-7).

This is a problem which was brought up more than two decades ago by Marwick, who noted that even historians tend to treat newspapers as primary sources of historic events, though obviously the writings in these newspapers are no more than interpretations – *translations* – and not unmediated (1989, p. 199). A problem then, a problem now: as a growing number of virtual models of monuments and whole cities are constructed and introduced to a large audience through gaming platforms, educational media and online databases, popular visual representations of the past are ensuring their longevity through numbers (see Gill 2009; Westin and Hedlund forthcoming). These are models which in all probability will, out of necessity, be the only sources of information for future research, rather than the deteriorating *physical* remains only available to a limited group of people. This is a situation echoing that of the early art historians who were left to describe Greek

art through Roman copies and intaglios (Frizell, Santillo 2010, p. 36). And just like copies, many scholars note, virtual models lack unprocessed information, therefore turning mute when one digs deeply (see Forte 2000; Kozan 2004).

Imagining a world where the *re*-presentation – the secondary source offered up through a presentation – is the sole remaining inscription of an artefact, or simply a society where artefacts and ‘culture’ are increasingly being experienced in a virtual realm, raises a number of questions, summarised by the inquiries of this thesis. These inquiries also encompass the modern museum, more forum than temple (Cameron 1971; Lavine and Karp 1991), which are entering a paradigm where contexts are rightly deemed more important than artefacts, and thus it turn to visualisations and technology to accommodate to the reality of this. Reading *visual representation* also in a wider sense as to include artefacts, events or phenomena presented in a certain way, we must consider both the practice of exhibiting (see Moser 2010; article 5), and the practice of communicating through different media (see article 6).

A brief summary of the included articles

Article 1, *Displaying Via Tecta – Visualisation and Communication*, was a collaboration with Barbro Santillo Frizell, professor in classical archaeology and ancient history and director of the Swedish institute in Rome. Herein we frame the problems of visualising in a context of communication in a post-modernistic society. We recognise a need in the scientific community to communicate through visualisations, but also a fear that these visual representations are easily turned into established truths. As an example we describe a possible exhibition in the *Via Tecta* at the Sanctuary of Hercules Victor, Tivoli. The *Via Tecta* is a unique feature in Roman

architecture. It is the gallery leading the traffic on the Via Tiburtina through the substructure of the sanctuary. This extraordinary space organised the urban side of pastoral life and reflects the economy of animal breeding, capital investments and markets, protected by the god Hercules.

Leaning both on detailed site documentation (Giuliani 1970; Giuliani 2004) and research results of a more hypothetical character suggesting that the gallery was used for tax collection (Bonetto 1999; Frizell, Santillo 2006), one of our ambitions with the exhibition was to visualise the Via Tecta in a context which stressed its role in the movements on Via Tiburtina. Thus it was framed as part of an organised economic system of animal breeding – the transhumance. The idea was to display this history through illustrations, digital reconstructions and models, elaborated according to the latest scientific results, and using the gallery itself as venue for the exhibition. A second ambition was to discuss how to communicate the possible functions of the sanctuary through images and inviting the public to participate in the interpretations.

Putting forth the idea of ‘open images’ – images that contained several layers of information – as a way to shift the visualisation’s centre of gravity from presenter to communicator, we discuss how a visual representation could promote different ways of interpretation rather than cementing visual icons in the public conscience. Furthermore, we explore various ways of communicating with the visitor that challenges these formulas and present a more heterogeneous representation of the scientific debate. The article was published in *Via Tiburtina – Space, Movement and Artefacts in the Urban Landscape*.

The exploratory article 2, *Imaging the Sanctuary of Hercules Victor*, which I wrote together with Tommy Eriksson from the Department of applied in-

formation technology at Chalmers, Gothenburg, describes the design and production process of a visualisation of the Sanctuary of Hercules Victor. The rapid progress of both information technology and digital media allows for an increasing amount of effective and exciting ways of documenting and communicating historic artefacts, phenomena and events. Three dimensional scanning through photogrammetry and laser as well as augmented reality through our phones and tablets, photorealistic computer graphics and interactive displays – the communication these technologies make possible, moves beyond the borders of ‘teaching’ and ‘learning’ into the hard-to-challenge realm of ‘experiencing’.

Exploring the pedagogic approach outlined in the previous article, we address both the philosophical and practical ramifications of communicating the past using technology which allows us to create visual representations that not only mimic a physical reality but also shape the public’s idea about the past through photorealistic visualisations. Visual signifiers are presented and discussed in a context where the visualisation is tested as a communicative device that encourages questions rather than acceptance. Furthermore, we discuss how a communicative exchange through the visual language can be adapted to let the audience de-construct the re-construction and track different layers of certainty in a visualisation. In the process we propose and test a set of core guidelines when creating historical visualisations, with the aim to enhance the pedagogical quality of the scholarly visual language. The article was published in *Archeomatica*, a journal that focuses on the technological aspects of visualisations within the field of archaeology. The research forming the basis of both this and the previous article was presented at a conference on

archaeological reconstructions at Istituto Storico Austriaco, Rome, 29 October 2009.

In article 3, *Interactivity, Activity and Reactivity: Thoughts on Creating a Digital Sphere for an Analogue Body* I start an in-depth exploration of the interactive medium I have made use of in the previous two articles. With a starting point in the *vocabulary of limitations* (see article 5) as a tool for finding structures which control communication, I examine how the human body has to adapt itself to communicate in a digital medium. This paper argues that interactivity, as an instrument to incite a two-way communication, is flawed. It disciplines the actor into a structure of finite choices rather than creating a milieu that allows alternative interpretations to be expressed. To discuss interactivity as an inquiring instrument I explore the concept of choice and reaction in the context of a subject-object relation, identifying conscious choice as an integral part of interactivity that is limited by the available reactions. By looking at interactivity from the humanistic perspective of an analogue body, I conclude that interactive media does not allow the body to act, only re-act. Hence, interactivity, in the capacity of a communicative instrument, should be supplemented with a suitable channel through which the human actant is free to transmit ideas processed outside of the interactive space.

This paper was presented at the AACE conference on educational multimedia, Honolulu, 22-26 June 2009, and was printed in the proceedings after a peer-review process. An early draft was ventilated at a seminar on culture technologies at the university of technology (KTH), Stockholm, 6 February 2008.

Article 4, *The Interactive Museum and its Non-Human Actants*, is a continuation of the previous article, and, subsequently, the articles before that,

where I put what I have learnt from them in a context of education. The interactive visualisation of the Sanctuary of Hercules Victor is brought into the discussion, and I question its ability to let an audience express itself. This explorative study, published in the *Journal of Nordic Museology*, highlights the different strands of interactive learning technologies available to museums and educational institutions, and analyses their function as non-human actants from a perspective of power and discipline.

Through a generalised symmetry I describe a specific technology – the interactive display – as an actant exercising the same autonomy as the other actants. This raises the non-human actant to the same level as the human actants and emphasises how it controls an equal part of the communication. In this way I try to map out how an exchange is manifested through a network of actants where the technologies conserve the inquiring actant's knowledge space rather than broaden it. Despite being offered as a technology to make the visitor heard and let her form the space according to her own ideas, the result is as curated as the classic exhibition: it reproduces the museum's interpretation of the past. I conclude that by itself, the interactive display does not challenge authority, but instead reinforces it.

In article 5, *Towards a Vocabulary of Limitations – the Translation of a Painted Goddess into a Symbol of Classical Education*, published in *The International Journal of Heritage Studies*, I question *what* we try to capture when visualising the past. Discussing how ties are accumulated and interpreted as the 'culture' of an artefact, I take a critical stance on the habit of making visual representations of origins and 'true' states, when, in fact, cultural ties are often made through different contexts. These contexts are often the producers of our sense of 'truth' and 'authenticity'. This ties in with the problems

involved in identifying and translating an artefact's properties to a representative, often digital, format (article 1 and 2), enabling the audience to cycle between different interpretations (article 3 and 4). Following the reinterpretation of a painted statue into a white museum artefact, I argue that the rules we have to follow in approaching an artefact create a series of unrelated socio-cultural connotations which shape our perception of the object. The 'culture' of the artefact is therefore largely the associations of the context through which it is presented. Hence, by distancing an artefact from an established context you also distance it from the networks that make up a large part of what the audience associates with 'culture'. To discuss this process I draw on the works of Callon and Latour, describing the visual representation as a *translation* – a process where the artefact is reinterpreted from one state into another.

As a method to describe properties sprung from the presentation of the artefact, I propose, and exemplify, a *vocabulary of limitations* for mapping the ties between the artefact and social interaction. By 'vocabulary', I mean a set of words and questions that could be used to describe an artefact, and through these gain a greater understanding of its impact on the expressions of society. This vocabulary helps us to identify deeper connections by focusing on how interaction has been shaped *around* the artefact. Hence, an artefact is so much more than its materiality and origin: it is its 'career' taken as a whole and all those values spawned through its position within a network of actants. These interactions are the 'culture' of the artefact.

As a companion piece to the article above, article 6, *Loss of Culture: the Lady and the Fox*, published in *Convergence: the International Journal of Research into New Media Technologies*, exemplifies how

the vocabulary of limitations can be put to work on a translation-in-process; the shift from analogue to digital books. This specialised vocabulary is here tested to see if it can help to identify an important part of 'culture' often overlooked when visual representations are made, and explain how an opposition mobilises and enrolls actants created from the socio-cultural connections of limitations associated with a format, not the content. A separation of the content from this format also means a separation of the content from the associations through which it has gained much of its 'culture'. Participating in the second international DREAM conference on digital content creation in Odense, Denmark, 18-20 September 2008, I presented an early draft of a text which became the foundation of both of these articles. Furthermore, this draft has been ventilated at a seminar on post-positivistic research at the university of Kalmar, 5 September 2008.

The final article in my thesis by publication, I call *Inking a past*. In much, this seventh article is the culmination of all the previous ones. Here I enter the procedures that create a visual representation. I describe the work of *Inklinsk Firenze*, Italy's by far most successful visualisation studio, and follow all the actants from idea to finished image. This representation is a construction, inscribed with symbols and properties. I unravel a map of the process behind this construction and put focus on those relations, associations and conflicts where translations occur and new hybrids are born in the form of inscriptions. This article reveals an ever present agency, the agency of the audience, which, despite being denied voice (article 3 and 4), steps forth as an influential actant.

I presented this article at the inaugural conference on critical heritage studies in Gothenburg, Sweden, 5-8 June 2012.

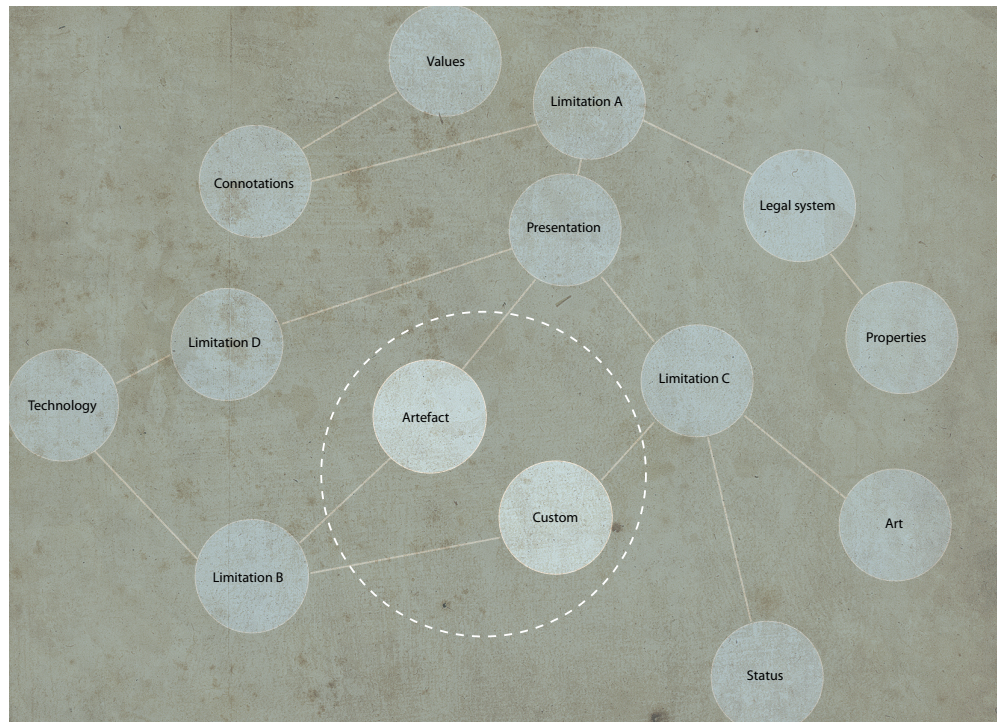


Fig. 4. **Network.** Surrounding the often visualised artefact or custom, there is a host of non-visual soft actants, such as limitations, making up the ‘culture’ – and production – of the artefact.

The result of my inquiries

Summarising the results of the above articles, which have all dealt with different aspects of the procedures involved in creating visual representations, their relevance to the main inquiries emerge: to re-present is always to displace, since time or space has been shifted. However, while to displace is also to lose, this loss can be lessened. In order to make it easier for future truths and new understandings to be expressed, it is advisable to establish signifiers communicating the uncertainty of the underlying research in those visualisations which are reconstructing historical artefacts, phenomena and events. Through transparency one perforates the concrete lid put on the interpretation of the past through every visual representation (article 1 and 2).

However, offering choices as a way to communicate this uncertainty may not by itself be enough to entice an audience to voice their own ideas, an

often stated goal by many museums and educators. Although presented as a visitor-empowering pedagogic technique, inviting different interpretations of the material at display, the interactive technology offered by museums and educators is a tool of conformity disciplining the individual and must therefore be treated as such (article 3 and 4).

We *can* create visual representations of ‘culture’, but first we must *understand* what constitutes ‘culture’. Artefacts and customs, whether exhibited, re-enacted or visually represented, are still predominant in the discourse regarding what ‘culture’ and heritage is, something which neglects the rich research literature on the depth of the concept (see Muñoz Viñaz 2005, Smith 2006). Much more than the immediate physicality of an artefact or custom, ‘culture’ is also a network of limitations and other non-visual actants with numerous ties to the social, legal and artistic expressions making

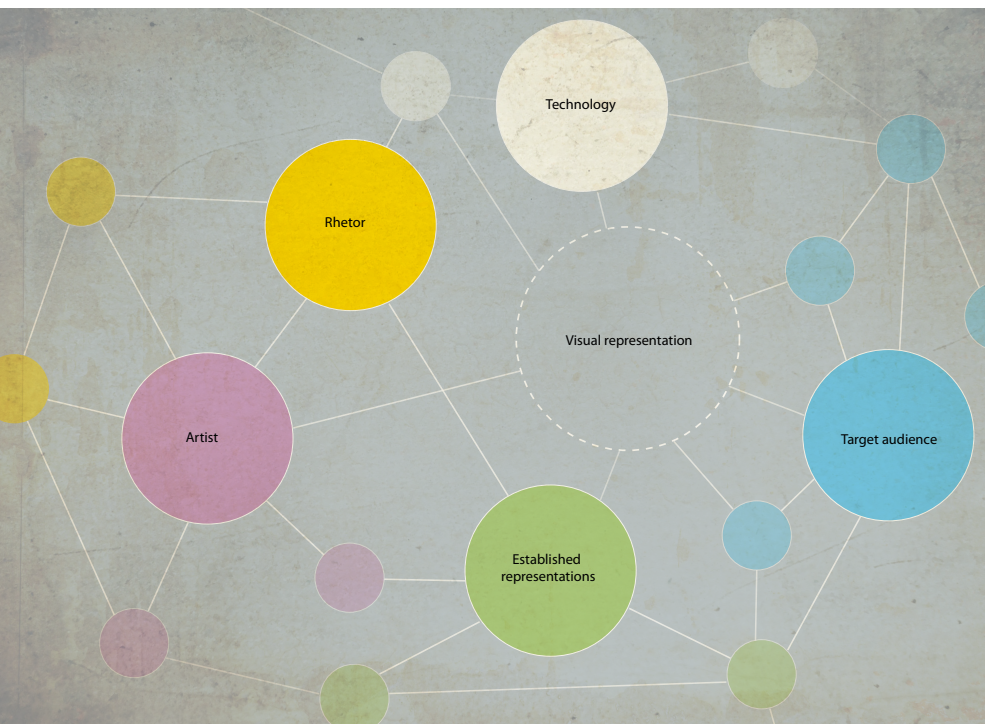


Fig. 5. **Negotiations.** Far from being the often imagined straight line, the path a visual representation has to travel, from being an idea of a rhetor to a finished construction consumed by a target audience, is an irregular one. Being the result of a series of negotiations by a network of actants, all mediating the end-result, the visualisation takes its cues from all actants around it, not least so from the target audience.

up society (fig. 4). These soft actants dwell in the vast plasma surrounding their much more public and frequently represented progenitors, but can be brought forth through specialised vocabularies of which the vocabulary of limitations is but one (article 5 and 6). I put forth this vocabulary as a tool to apply ANT to studies on the ways in which cultural properties are formed and upheld.

The 'we' who represent 'culture' is not limited to rhetors, artists and museums, but includes the audience (fig. 5). Although not given a voice at the museum (article 3 and 4), the audience, as a group, permeates all procedures which lead up to a finished inscription (article 7). Though it is easy to believe them to be without saying, as a group they are ever present making their voices heard in all the negotiations.

To give a more elaborate account of how I have treated the main inquiries of this thesis, and in the

process give a comprehensive reading of how the creative procedures behind a visual representation constructs and reinforces various properties of the artefact, phenomenon or event visualised, I must divide into parts what I have learned from the articles above and then re-assemble these parts into a whole. Before that, however, I will put my field of inquiry into the greater context of related research and theoretical frameworks.

Theoretical framework:

field(s) of inquiry

This section is both an introduction to the theoretical framework of my research and an overview of neighbouring fields of inquiry. The purpose is to position myself in a wider context of research in order to better identify my contribution, and to make note of studies that have contributed to the formation of this thesis.

Despite studying the past, my interest does not run entirely parallel to that of the traditional historian or archaeologist, who study human activity through the analysis and theorisation of salvaged material data. Although postmodernist and deconstructionist thoughts have been influential in both of these disciplines (see Spivak 1988), the overarching goal is nonetheless to create models true to an objective interpretation, expanding our knowledge of earlier times.

My research however, though heavily reliant on the work of other historians and archaeologists, strives to expand our knowledge of those symbols through which the past is communicated and upheld, rather than of the past itself. Where historians and archaeologists traditionally look to sources of knowledge of the past, I instead consider the secondary sources which *their* activities give rise to. My effort thus is to examine the actual inscription of cultural properties through different techniques of visual representation, an act that both models and conserves an understanding of the past (see Moser 1998; 1999).

To further differentiate my focus from the above mentioned disciplines, it could be argued that in my research I seek to answer the question of *which processes are constructing our understanding of what is 'true' or 'authentic'*, related to, but conceptually different from, the classic question of *what is 'true' or 'authentic'*. I opine that cultural heritage is not synonymous with what is traditionally attributed to the word 'truth'. Likewise, the first syllable of representation does not denote a faithfulness to an original meaning, a restoration in the classic sense, but rather it indicates a new cycle in the life of the artefact, where new meanings are allowed to be expressed.

The act of 'restoring' – a term that lays bare the belief that we can turn back time and bring an artefact, unmediated, back to an earlier phase in its career – has been critically discussed by, among others, Muños Viñas (2005) and Hughes (2011). The latter summarises it beautifully as “[betraying] an assumption that the restored object is identical to the original, and simultaneously disavows the idea that the restorer’s intervention might have changed the [object] in any significant way” (*ibid.*, p. 24). Far from being neutral, properties are in these acts and milieus inscribed into artefacts and reconstructions, and are, as a consequence, made durable by being translated into a seemingly material form (Latour and Woolgar 1979, p. 63; Latour 1992, p. 256). The idea is made into an ‘immutable mobile’, an inscription, or artefact, that can be brought from its original context and be more easily communicated (Latour 1986, p. 7).

Latour writes extensively on the reasoning behind the act of creating these inscriptions (1987; 1992; 1999), and he turns his focus specifically on illustrations in *Drawing Things Together*, where he quotes Alpers on the subject of ‘worldviews’, a term Alpers provides with a material meaning: “how a culture *sees* the world, and makes it visible” (Latour 1986, p. 9; Alpers 1983). A new worldview, a new visual culture, is as clean a break from what was before as a new episteme. It is not just what is chosen to be depicted that changes, but also in what way the already depicted is transformed by this new gaze. Works as broad as the above mentioned authors’ inspired studies into the politics of inscriptions and the emergence of distinct worldviews, or comprehensive histories of techniques such as Gage’s excellent *Colour and Culture* (2009) or Tufte’s *Visual Explanations* (1997), are beyond the scope of this thesis. They do however provide a

more than sound foundation for my more specific goal of offering a description of how cultural properties and qualities are inscribed in the process of making a visual representation.

**Theoretical framework:
recent studies of visual representations**

The polemics between research and visualisations within the field of archaeology has been explored in earlier studies, with the conclusion that it is a process where communication technologies have much to offer if they are integrated into the research process (see Bradley 1997; Moser 2001; Forte 2008). There has also been ample research on the technical aspects of new media and how digital technologies can be utilised to communicate research (see Debevec 2005; Pollini *et al* 2005; Kahr-Højland 2007). Worthy of note is the research done by Favro, Forte and Frischer, who, together with other researchers, have presented a plethora of interesting studies on virtual representations of the past where they test the practical limits of available technology (see Forte 1997; Frischer *et al.* 2002; Frischer, Favro *et al* 2003; Helling *et al.* 2004; Favro 2006; Frischer and Stinson 2007). If these studies on the possibilities and limitations of the virtual realm have the practical implementations as a point of departure, there is equally interesting work done on the theoretical implications of new technology (see Ammerman 2006; Haselberger and Humphrey 2006; Cameron 2007; Flynn 2007; Kenderdine 2007; Arnold 2008; Hermon 2008; Roussou 2008; Kalay 2008), along with studies on how unchallenged images have a tendency to become hard facts (see Shapiro and MacDonald 1995; Molyneaux 1997; Klynne 1998; Smiles and Moser 2005). The majority of these studies concern themselves with developing techniques through which the past can be repre-

sented as ‘correctly’ as possible – the translation from findings to reconstruction done in a neutral way as to not add any ungrounded interpretations coloured by social interaction or speculation. This could be put in stark contrast with my studies, which deals with visual representations as an interpretational practice, where any cultural properties derive from the artefact’s contact with the functions of social interaction, past and present, leaving a track of symbols and traditions that can be utilised to tell a more complete story.

Parallel to the advancements in visualisation technologies within the field of archaeology, there have been discussions on the perception of cultural heritage sites, understandings and artefacts from a perspective of authenticity, but also on this perception, in itself, as a generator of new values (see article 6). These discussions have given rise to the concept *performative authenticity*, an authenticity that bridges the authenticity of the original and the authenticity that an audience connects to past experiences and what is expected (Knudsen and Waade 2010, p. 1). This has been explored under many names by, among others, Grayson and Martinec (2004), Ray *et al* (2006), Malpas (2008), Silberman (2008), Al-Sayyad (2008), Selby (2010), Watson (2010), Wilson (2010) and Latour and Lowe (2011). Quoting Layton, Stone and Thomas, Koerner notes that such a perspective raises “the possibility that an ‘inauthentic’ monument might provide the ground for an ‘authentic’ experience, while an ‘authentic’ prehistoric site might offer no such opportunity” (2006, p. 212; Layton *et al* 2001, p. 18).

AlSayyad, critically discussing the notion of authenticity, builds a convincing case through his multi-layered study of the relationship between original and copy. Much like Latour and Lowe (2011), AlSayyad points to all those instances

where the original feeds of the copy, growing stronger in the process but also less distinct in its originality. In several of the examples AlSayyad draws upon, there occurs a displacement where the original treats the replica as a preserved state it can emulate. Commenting on how the Egyptian pavilion in the Paris exposition of 1889 functioned as a blueprint for restorations of a fountain in Egypt a hundred years later, he notes that “the copy of the [fountain] became the means by which [the fountain] could continue to exist, and the relationship between the two became mutually sustaining if not constitutive” (2008, p. 164).

Voase takes on the popular visual representations of history and heritage in movies such as *Titanic*, *King Arthur* and *Sky Captain and the World of Tomorrow*, noting that “the past has become a supermarket of styles to be raided and reproduced” (Voase 2010, p. 119). The authentic is *not* the same as the real, but should, according to Voase, rather be seen as something which is faithful, or accurate, in its representation. A natural follow-up question would therefore be “faithful to whom or what?”. Faithful to the expectations of the audience or to some elusive past? The concept of performative authenticity may here offer an answer, where authenticity is viewed as a highly subjective mixture of experiences and memory and thus separated from the idea of an objective past. A final thought by Voase, which struck me as particularly insightful, summarises an important aspect of the memory debate:

“[It] would be useful to bear in mind that, if visualisations of the past are selective and distort the past, *so does the human memory*” (*ibid.*, p. 120, italics by Voase).

Naturally, talking about perception, studies within the field of cognition has also been of interest. In my research this field is frontmost represented by

the writings of Latour (1986), Nishizaka (2000), Bhattacharya and Moallem (2009) and Bower and Hedberg (2009). Latour puts the concepts presented within ANT to the test in his thesis on visualisation and cognition, describing the formation of a cognitive understanding, something I touched on briefly above and that I will return to further along in this summary. Nishizaka’s treatment of seeing as an “organisational feature of an embodied, visible activity” (2000, p. 105) is of interest for the concept of performative authenticity outlined above. Seeing is, in Nishizaka’s reasoning, not a processing of information separated from a body, but a consequence of this body’s activity. In article 3, I explore how the movements of such a body are disciplined by a digital interface. Bhattacharya and Moallem have studied learning environments and cognition in multi-sensory settings, recognising the impact new media have on educational institutions, something I treat in article 4. Bower and Hedberg, working within the field of Human Computer Interaction (HCI), present an integrated approach to the development of educational user interfaces, where recent studies within cognition science and multimedia learning are put to the test.

The recently published *Multimodality – A Social Semiotic Approach to Contemporary Communication*, by Kress, deals exhaustively with the way in which several senses interact and together form an understanding of the world (2010). This is something that comes naturally to anyone working professionally with communication, though not always expressed so precisely. Furthermore, this is a view that echoes the research findings of Nishizaka (2000) and permeates the concept of performative authenticity. Kress makes a point of differentiating between representation and communication, describing the former as *taking place*

in a social environment and the latter as *constructing* a social environment. Moreover, he makes an observation – which I too have made though not expressed in such a skilful manner (article 2) – that image representation demands an ‘epistemological commitment’ lacking in text (Kress 2010, p. 16). What can be avoided in speech or text must be expressed in an image representation. To draw an example from my work on the Sanctuary of Hercules Victor, where in text it is often enough to state that the upper gallery had a banister, the image must commit to height, form and material.

Although written very densely, it is easy to consider *Multimodality* the definite work on contemporary communication. There are however areas that Kress does not cover. He writes that “communication is framed and shaped by culture and changes culture in the process of communication” (*ibid.*, p. 51), but he does not investigate this any further. This is a process close to the heart of this thesis, and some aspects of my research can be viewed as a study of this, by Kress neglected, subject. While standing on the strong foundation *Multimodality* represents, in this thesis the construction of ‘culture’ through visual representation is a central theme.

Champion, in following a reasoning where he seeks definitions of cultural heritage, virtual heritage and new media, proposes “five features of new heritage that may help increase engagement, memory recall, and more appropriate learning” (2008, p. 190). These are *Explorative space*, *Shadow embodiment*, *Social realms*, *Uncertainty* and *Meaningful historical and heritage-based learning*; the first two grouped under the headline *Interaction*, the following two under *Content* and the last one under *Output*. The fourth of these features, the one of most interest for my work, the depiction of uncertainty, is however only expanded upon in a

few paragraphs stating that it is not just about presenting “the uncertainty of the authenticity of data acquired, but also the debates in the professions that acquired that data” (*ibid.*, p. 196). I consider the communication of uncertainty to be a key element, and in two of the articles my co-authors and I propose different visual signifiers conveying insufficient data (article 1 and 2). For an exchange to be productive, both parties have to be able to communicate uncertainty. To return to the example above, the exact, *certain*, image representation of a banister appears to be non-negotiable, even though it may be based on insufficient data, while a representation that communicates its uncertainty invites other actants to question its form.

A form, repeated in its certainty, runs the risk of becoming a memory. Following the same reasoning, Wilson, using the memory of the Western Front as an example, argues that this memory is a product of popular images, visual representations, depicting the battlefields of Northern France and Belgium.

“More recently, the relationship between memory and the image has been debated within the context of mass production and the advent of the post-modern critique. In this regard, it has been argued that the image, whether as a photograph or transmitted through the mass media, aids the derogation of modern memory” (2010, p. 77).

Quoting a passage by Deleuze, Wilson expands upon the idea that the image of the past “allows the viewer to feel a connection to a past that they have witnessed through the image, a sensuous experience for the viewer as they make a ‘leap into the being of the past’” (*ibid.*, p. 78). The image becomes the historic past, a sentiment which echoes that of Smiles and Moser (2005).

In the often cited *Reading Images: the Grammar of Visual Design*, by Kress and Leeuwen (2006), the

authors treat visual communication as a parallel to language, describing the grammar of the former, a field often neglected. I touch upon this in article 1, and more extensively in article 7. Just like the grammar of language, this grammar is culturally specific, though the international reach of the entertainment industries, controlling the dominant visual language, has a normalising effect on the visual communication across the world (Kress and Leeuwen 2006, p. 5). An object can never be represented in its entirety, as a 'whole', but is filtered by the *sign-maker* who takes it apart identifying 'criterial aspects', a process ruled by interest. These criterial aspects are part of the meaning, the *signified*, which represents the essence of the message the sign-maker wishes to communicate through *signifiers*. When the sign-maker constructs a message, the interpreter of this message – the audience – is, as this thesis argues, an equal part of the construction since the message is adapted for this specific audience. As I will return to, the failure of the first visualisation in the prologue of this thesis, is the failure of adapting the signifiers according to the understanding of the interpreter. Naturally, since it is *communication*, there are rules:

“When a semiotic mode plays a dominant role in public communication, its use will inevitably be constrained by rules, rules enforced through education, for instance, and through all kinds of written and unwritten social sanctions. Only a small elite of experimenters are allowed to break the rules – after all, breaking rules remains necessary to keep open the possibility of change” (*ibid.*, p. 2).

One way of approaching these socially sanctioned rules is through the concept of ritual, put forth by Foucault in *A Discourse on Language* (1971) as an organisation of communication which decides what qualifications one must possess to be

allowed to act, and what can be expressed. These rituals, present in every communication but to a heightened degree when an authority is involved, are upheld by non-human actants in the form of architecture, social conventions, policy documents and technologies, which discipline every interaction (see article 4, 5 and 6 for a comprehensive description of these non-human actants). Arnold remarks that “the pioneers in the use of digital artefacts in historic research need to remain aware of the limitations of current technologies and the restrictions of their applicability” (2008, p. 169). This is an important observation, something I have explored in my studies on interactivity as a tool for museums (article 3 and 4), and technology as a generator of cultural value (article 6). I conclude that these technological limitations discipline the user, but in this act also shape socio-cultural expressions around them. Thus, social, artistic and legal functions are created through the restrictions of a technology or interaction.

Silberman argues that the challenge lies in communicating the activity *surrounding* an activity or artefact, rather than establishing “a definite simulacrum of the past” (Silberman 2008, p. 81). He directs our attention to the fact that an object is as much a representation of intangible traditions and social history as its physicality. Picking up this thread, by following the inherent limitations of an artefact, or those limitations put on the interaction with it, I have developed the aforementioned *vocabulary of limitations* through which some of the 'social history' could be described. I present this vocabulary in two articles (article 5 and 6).

Though there is an abundance of good anthologies exploring a variety of thoughts on the role of visual representations within the field of archaeology and heritage studies – *Envisioning the Past* (Smiles and

Moser 2005), *Images, Representations and Heritage* (Russel 2006), *Theorizing Digital Cultural Heritage* (Cameron and Kenderdine 2007), *The Virtual Representation of the Past* (Greengrass and Hughes 2008), *New Heritage* (Kalay, Kvan and Affleck 2008) and *Culture, Heritage and Representation* (Waterton and Watson 2010) being but a few – they neglect discussing how qualities are enrolled, created or reinforced in the design process of the visual representation. Nor do they offer any deeper studies of non-visual properties as mediators when inscriptions are made. Nevertheless, owing a lot to these earlier studies, my research can be viewed both as an attempt to complement their work, filling in the above mentioned gaps, and as an effort to describe these various views of technological shifts and possibilities, powerful images and reconstructions, authenticity and qualities, as active negotiations.

Philosophically, my research brings me close to the seminal anthology *Envisioning the Past*, edited by Smiles and Moser, in which the editors have advocated the liberation of the image “from its impossible role as an objective record” (2005, p. 11), an approach I explore when I question the practices of communication. Coming from the field of archaeology, the various authors in the anthology make a convincing case that our understanding of the past is created through visual representations, an undertaking I am most grateful for since it is a key understanding I share, and one that I have made a stepping stone for my research. In my articles on the practice of visualising, I lean heavily on the introduction by Smiles and Moser, Arnold’s chapter on ‘unlearning’ the archaeological image, Dixon’s analysis of the work of Piranesi, Phillips’ discussion on the Iron Age Lake Village images by Forestier and Earl and Gillings’ contribution

on the problems of computer-generated imagery. It is, however, in the scientific studies of Latour, Callon, Hennion and Hetherington and ANT I have found a practical methodology which helps me describe the interaction between man, technology, visual representation and artefact, which is an important issue in this thesis.

Theoretical framework: methodologies

In the study of the construction of scientific visual representations, I have found actor-network theory (ANT), with its roots in the sociology of scientific knowledge, to be a helpful method. The strength of ANT is not in the broad strokes, but in mapping out the details, making it ideal for my current research.

ANT is a perspective on the world, closer to metaphysics than a method or theory, though it is a perspective which informs the methodology in great detail. In my research, ANT has primarily been a vocabulary, a set of words and concepts through which I have been able to describe the processes I am studying, and through this description get a fuller understanding of how different actants are associated. This section being an introduction to the theoretical framework of my research, and the methodology, I find it appropriate to here present the literature on which I base my interpretation of these concepts. Since ANT permeates the following sections of this summary as well as my articles, this introduction will also serve as a bridge to my application of this theoretical framework.

Often described as a sociology of associations, ANT maps out how actants are brought together into a network, assembled and combined into a whole constantly challenged and confirmed through negotiations. Harman writes that these actants “become more real by making larger por-

tions of the cosmos vibrate in harmony with their goals, or by taking detours in their goals to capitalise on the force of nearby actants” (Harman 2009, p. 19). Quoted in my articles the reader will find formative works such as *Laboratory Life* (Latour and Woolgar 1979), *The Three Little Dinosaurs or a Sociologist’s Nightmare* (Latour 1980) and *Visualisation and Cognition: Drawing Things Together* (Latour 1986). *The Three Little Dinosaurs* functions as an introduction to the idea of a relativistic view on the construction of understanding, something I will return to later in this summary, and *Laboratory Life* presents the genesis of what later is developed into ANT. Latour and Woolgar follow here the creation of inscriptions at a laboratory, arguing that knowledge is transmuted into the aforementioned *immutable mobiles*, a theme revisited in *Drawing Things Together*.

To cover important ANT concepts, I turned to, amongst others, *Unscrewing the Big Leviathan* (Callon and Latour 1981), which deals with *hybrids* and *black boxes*; Callon’s seminal paper *Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay* (1986), wherein the author develops the concept of *translation* as an analytical instrument; *Science in Action* (Latour 1987), which exemplifies the use of *enrolment* and *negotiations*; *Where Are the Missing Masses? The Sociology of a Few Mundane Artefacts* (Latour 1992), wherein artefacts, non-humans, are treated as actants in *programmes* and *anti-programmes* and *On Technical Mediation – Philosophy, Sociology, Genealogy* (Latour 1994), an article which explores *mediation* and *obligatory passage points*. These are concepts important for both my method and my analysis, and I will offer a brief explanation of them further on in this summary. Of course, few studies of ANT would be complete

without *Aramis, or the Love of Technology* (Latour 1996), which demonstrates the non-human actant’s role in negotiations, and *Reassembling the Social* (Latour 2005), where ANT is put in a broader context of developments within sociology.

Regarding ANT applied to museums and exhibitions, I have turned to various articles by Hennion, Hetherington and Grahn. Hennion’s *Les Jambes d’Hercule: Des Oeuvres et du Gout* (1996) led me to his earlier article *The Production of Success: an Anti-Musicology of the Pop Song* (1990), an inspiration for my description of Studio Inklinc Firenze (article 7). Hetherington’s articles *From Blindness to Blindness: Museums, Heterogeneity and the Subject* (1999) and *The Unsightly: Touching the Parthenon Frieze* (2002) both deal with visitor movements within exhibitions, a subject I treat in article 5. Grahn introduced me to the term *museal fact* in her article *From Everyday Artefacts to Museal Facts* (2004), wherein she examines the transformation of object into artefact.

These vocabularies, supplemented by my own, allow us to understand how rituals limiting our interaction with an artefact shape our perception of it; how a new format can be rejected for disassociating itself from a limitation; how a digital display at a museum, giving us a chosen number of options, limits our expressions as effectively as a curator deaf to all interpretations not her own; how an artist inscribing his knowledge into a visualisation using the tools at hand sends a new materiality out into the world, a hybrid eager to attract associations and be assembled into networks. Humans and non-humans working on the same side, sometimes together and sometimes alone.

A visual representation, and the techniques and technologies that make it possible, is a network

of both human and non-human actants, some of them only recognised by their effect on those actants closest to them and some only recognised through a specific vocabulary. Intertwined these actants make up our understanding of what is ‘culture’, and assemble our grasp on the past. To loosely paraphrase Latour’s saying on truth, these actants do not hold together because they *are* ‘culture’ and our past, but *because they hold together they become* ‘culture’ and our past (1988, p. 185).

Become our past 1:

the ‘culture’ of limitations

“We know how to draw, to simulate, to materialize, to zoom in and out on objects; we know how to make them move in 3-D space, to have them sail through the computerized virtual *res extensa*, to mark them with a great number of data points, etc. Yet we are perfectly aware that the space in which those objects seem to move so effortlessly is the most utopian (or rather atopic) of spaces. [...] we know how to draw *Gegenstand* but we have no clue what it is to draw *Ding*” (Latour 2009, p. 12).

While a visual representation is a description at least one step removed in time or space from what is described, cultural heritage, as a bundle of both tangible and intangible parts, seems to exist outside such easily mapped dimensions. In the words of Silberman, cultural heritage is an “ever-changing array of objects and symbols, a complex mosaic of artefacts, images, and customs, that demand our attention and demand that we give some meaning to them”, while the past is an “untouchable phantom: a lived reality that survives only in fragments and can be experienced in retrospect” (Silberman 2008, p. 82). Arguing that we can never “re-create the past as it actually was, with sense of uncompleted present-ness and uncertain expectation” (*ibid.*), Silberman seems to state that any visual representation of the past is from the

out-set bound to be lacking. Indeed, what we call history is often a rickety assemblage – a past interpreted through all too few surviving sources (see Lowenthal 1998, p. 112-113). However, the past is just a fragment of what makes up our cultural heritage. Neither history nor past, cultural heritage is by necessity a representation already to begin with. A loosely weaved tapestry of fact and fiction, it is a description free from both the earnest goal of giving an objective account of history, and the authority of the past. Anyone creating new visual representations thereof needs to tread warily.

Both a description and the product of a negotiation, the creation of a visual representation is a process characterised by a high level of granularity, countless micro-processes, whose depth of detail puts it well out of contact with, comparatively, large scale interpretations, generalisations and affiliations (see article 4 and 7). I am therefore, in my descriptions, unwilling to *artificially* supplement such a contact to the process through the use of theories coloured by ideology. Up close, a stone tablet is a whirling mass of electronic particles in empty space, each particle free from whatever connotations the tablet as a whole amass through what is inscribed upon it. Likewise, a single letter of this inscription is not accountable for the meaning of those words or sentences it helps form, political and religious as they may be. In my view, the minutiae in the creation of a *sign* is the building block upon which, much later, politics and memory, as well as identity and sense of heritage, are stabilised. It is not a process where the primary movement is that of cultural values trickling down and affecting the parts, but a process where the greater movement is that of parts soaring upwards – parts which interconnect, create ties, fail and succeed, negotiate and, finally, are assembled, or perhaps interpreted, as ‘culture’.

Negotiations occur at the site of controversies, before they are stabilised, deciding what the ingredients are “out of which the one common world might be made – or not” (Latour 2005, p. 135). However, this is a process that does not have to be intentional, planned or conscious. When describing such a negotiation between parts, symmetry should be maintained between the natural and the social world (Callon 1986, p. 198), eschewing the modernist notion of a division between the two. In including those actants traditionally ascribed the natural world, this is not a negotiation done in the classic sense of discussions and haggles between two sentient beings, but, nevertheless, the end-result is the same. Negotiations between human and non-human actants are *constantly* being performed all around us on different scales. Therefore, I treat ‘culture’ as a sum – a whole reflecting the constant negotiation of its parts – where the whole does not guide but follows.

This approach of treating ‘culture’ as the sum of parts is by no means unique, though elsewhere not always explicitly posed as a conscious analytical stepping stone in itself. Describing the ancient drove roads of Italy, Santillo Frizell notes that they were “projected according to an inherent logic, based on decisions which organised space and evaluated certain features in the landscape, such as fords for crossing the river, water supply, access to pastures” (Frizell, Santillo 2009, p. 40) – parts adding up to the ‘culture’ of transhumance, not deriving therefrom. Hence, the emerging politics of temples and taxes along the road were a symptom, not a cause (see article 1). Any visual representation of ‘culture’ solely mimicking appearance is therefore bound to be unsatisfying, since it is no more than a representation of a hollow vessel until all those parts that make up ‘culture’ are identified and accounted

for. However, such a survey of the depth of what we consider ‘culture’ can never be complete if it does not also include those non-visual parts, or *actants*, which are of a less solid form, and whose presence can only be gauged through specialised vocabularies and close study of their effect.

To address this, I developed what I have come to call *a vocabulary of limitations*, a vocabulary which supplements the greater method of ANT (article 5 and 6). Actants come in many sizes, constituting both the smallest and the largest entities in any association. No difference if it is a person or an artefact, if it has an effect on other actants it has earned its place in the description of the various associations making up a network. However, just as humans are not enough to uphold a network, but must enrol materiality to make any constellation durable and stabilise a common position by “vibrating in harmony” (Harman 2009, p. 19), I argue that the material world is not enough to describe the formation of associations adding up to ‘culture’. Or rather: the material world has grown into habits and connotations with associations of their own.

In ANT, actants which shape a message are referred to as *mediators*. They are *mediating* the input into a changed output, adding or subtracting information or movement (Latour 2005, p. 39). Their counterparts are called *intermediaries*, which transport a message unchanged. Although any follower of ANT would argue that a great many of those actants which at a distance may be taken for intermediaries, at closer scrutiny are often revealed to be mediators (Latour 1994, p. 36). In fact, to understand how ‘culture’ is formed, the majority of artefacts and persons surrounding us should be considered mediators to some degree. However, focusing on effect, ANT has largely ignored what is often referred to as the *affordance* of an arte-

fact – the repository of cues shaping “the nature of content in a given medium” (Sundar 2008, p. 75; Gibson 1977). These non-visual and soft actants can be read as *currents* flowing between more solid actants, mediating either by making certain behaviour more likely or by attracting certain human and non-human actants.

If a study strives to describe any entity that makes another entity move, these currents have earned their place in this description. Needless to say, they *are* etheric in nature and thus seem to shy away from the grounded approach of ANT, with its focus on effect rather than intentionality. As stated above, ANT strives to maintain symmetry between the action of human and non-human actants. This does not mean that the actions of non-human actants are given *intentionality*, it only suggests that, in the study of action and effect, intentionality is largely irrelevant. Whether an action was intentional or not does not matter much if the effect was the same. However, when I argue that *limitations attract associations* (article 5), and eventually amass ties accumulated into ‘culture’, effect and materiality are very much in focus. The for all appearance non-visual ‘soft’ actants – or *currents* – are grounded in materiality, and they can be followed from there through the vocabulary of limitations into the assemblage often referred to as ‘culture’.

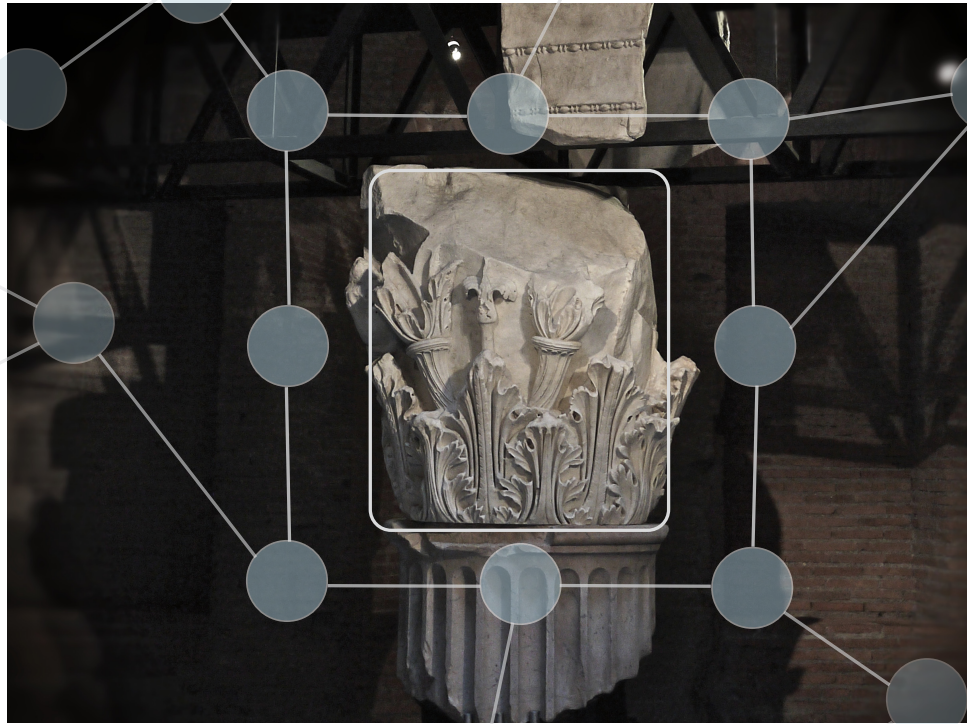
These flowing currents of limitations and associated connotations, neither human nor non-human but the product of both, populate the vast *plasma* (see Latour 2005, p. 244-245) between the more solid actants. Directing the action, their presence can be clearly felt anytime an act is carried out by habit or association rather than necessity, and an extra step is added to a process for no other reason than to re-enact a memory. Turning pages on an e-book reader or associating a white statue with

exclusivity and ‘culture’, both are actions directed by currents sprung from limitations now overcome – through digital formats and an abundance of factory-made statues – but nonetheless of cultural significance (as demonstrated in article 5 and 6).

By *limitation* I signify anything that hinders any conceivable action or free movement. For instance, one limitation of a printed page is that you cannot correct any mistakes (article 6). The glass panes in front of a renaissance painting, or the red cords separating you from an artefact, limit your possible movements and your senses to that of sight (article 5). A much more mundane example would be that of an ordinary fridge, whose size, whether it is large or small, puts different limitations on how much the owner can store within and, as a consequence, forces different kinds of habits. These habits are not restricted to situations where the owner is in direct interaction with said fridge – the artefact – but reaches out into a wider set of associations including restaurants and grocery shops far removed from the confines of the kitchen. The size of the fridge could also be a reaction to these associations, which all negate the need for storing large quantities of food in the apartment. Is the fridge ‘culture’? No, it is simply an artefact whose eventual cultural value is derived from those associations it has made or that it is a product of, something that must be taken into account in any visualisation hoping to capture the whole of the fridge.

As the vocabulary of limitations demonstrates, limitations constitute the borders of an artefact or phenomenon and permit an explanation of how associated actants are shaped by these borders into what we have come to refer to as ‘culture’. In other words, it is not the physical artefact, but the actants the artefact assembles,

Fig. 6a. **Limitations.** A corinthian capital *inside* Museo dei Fori Imperiali, surrounded by actants shaping and limiting our interaction with it. Opening hours, guards, spotlights, signs, cords, museum catalogues, descriptions, contextualisations, other visitors and ticket prices: all these actants are assembled by the corinthian capital.



visual or non-visual, that make up the greater part of any ‘culture’. Moving into the world of religious rituals, collections and museums, the vocabulary identifies those socio-cultural ties we interpret as ‘culture’. Both through those hard actants assembled in the presentation of an artefact, such as conservation practices and exhibition technology, things that shape our interaction with it, and also through the currents sprung from the inherent limitations of this interaction (figs. 6a and 6b).

Thus, the artefact imprints an inverted shape of itself on all social interaction through the limitations it imposes on the associated actants. In this reasoning, limitations equal a great part of both ‘culture’ and artefact, and disparage any notion of an artefact or phenomenon as an island unto itself. ‘Culture’ is not the artefact, but the way artistic, social and legal expressions and functions

have bent themselves around the artefact, due to the limitations associated with any contact with it. Since cultural properties are bound to socio-cultural practices, they are therefore lost when removed from the context these limitations constitute (article 5).

This becomes even more clear if we view the object not as an entity which could be separated into artefact and context, but as a hybrid – an entity made up of associations spread over both space and time (Tait and While 2009, p. 735). To map these associations and create a fuller visual representation, the limitations marking the outer borders of an artefact must be approached as body-less actants, part of the network making up the entity.

Limitations related to movement and access constitute one such contact with a border, and identifying yet others is of great aid in trac-



Fig. 6b. **Unlimited.** A corinthian capital *outside* Museo dei Fori Imperiali, lacking actants shaping and limiting our interaction with it. When the artefact is removed from the context of those limitations, it is also removed from many of those properties perceived to be making up its ‘culture’.

ing the outlines of an artefact’s impact. What limitations were put on gender? What were the limitations of the visualisation techniques of the time? And how did the limitations of the available technology shape the presentation of the artefact? (article 5).

It is important to consider these underlying qualities when approaching different techniques of visual representation – both through digital and analogue means – since these techniques translate an idea into form and, by extension, shape how the past is perceived. The result, an inscription, is neither a simulacrum nor a complete version of reality, but “a representation of some ‘relevant characteristics’” (Arnold 2008, p. 159). To avoid introducing anachronistic properties into this reality, a historical visualisation must therefore take into account in what way our deeper non-visual perceptions of the

artefact, phenomenon or event have changed through later translations in its career.

A recapitulation of important outtakes from this section: cultural heritage is a representation, so any visual representation thereof is a representation of a representation. As ‘culture’ is the sum of parts, a representation solely mimicking appearance – ignoring the non-visual associations – is no more than a representation of a shadow until all those parts that make up ‘culture’ are identified and accounted for. Limitations constitute the borders of an expression and as such they attract associations, creating ties which are eventually accumulated into the concept of ‘culture’. Visual representations translate an idea into form and shape how the past is perceived.

Become our past 2: imaging the bridge of ashes

“According to Vasari, Brunelleschi measured all the important buildings, temples, basilicas, aqueducts, baths, arches, theatres and amphitheatres. He excavated to understand the proportions of the buildings, studied the details, and made drawings so that when one looked at them it was possible to imagine ancient Rome still intact” (Jokilehto 2005 [1986], p. 12).

“The past is not lost to us, is not a bridge that has been burned leaving only ashes, but rather is an open way, that all of history is there to be explored, learned from” (Zelazny 1976, p. 147).

When visual representations of our cultural heritage are created, the theoretical is made tangible, something which adds weight to what is argued. Understandings, values and narrations are given form. As a by-product, the visualisation becomes a creator of identity. Chasing a past beyond material sources, our understanding of what has been can only be described as relativistic since we model it in our effort to describe it. Far from being a defined width on a linear timeline, the past is ever present and under constant construction. The visual representation is not the past, it can never be more than an interpretation and translation aimed at communicating a reasoning or meaning and making it comprehensible, but, nonetheless, our grasp of the past *is* a representation.

A visual representation is an event revisited – not the event itself – where a layer of interpretation and focus has been added. To visualise is not to be a quiet servant, but to be a mediator, to stir things up and put form to thought. Hence, the complexity of an event is displaced by a manageable inscription that can be communicated, but is in this act reshaped into something new (article 4). Using the terminology of ANT, this could be described as a translation, a process where the ar-

tefact or phenomenon is linked to another actant and is in the process mediated.

“By translation we understand all the negotiations, intrigues, calculations, acts of persuasion and violence, thanks to which an actor or force takes, or causes to be conferred on itself, authority to speak or act on behalf of another actor or force: ‘Our interests are the same’, ‘do what I want’, ‘you cannot succeed without going through me’. Whenever an actor speaks of ‘us’, s/he is translating other actors into a single will, of which s/he becomes spirit and spokesman” (Callon and Latour 1981, p. 279).

In a later text, Latour evolves upon this, meaning that *everything* is translation (1988). Every time an actant links with another actant, a translation occurs negating any unmediated contact as the translation process mediates goal, scope and result. Furthermore, the translation, as the result of a negotiation, supplements the goal, scope and result of an actant with those of the other actants involved in the negotiation. A negotiation occurs when there is friction and one or several actants have to change their behaviour for interaction to continue and the network to keep functioning. This often results in a *hybrid*, a mix between human and non-human. Just like negotiations, these hybrids are present on all scales.

As one can follow, a translation is not neutral, since it is coloured by contact, expression and interpretation (see article 3, 4 and 7). Callon writes that “to translate is to displace” (Callon 1986, p. 214), an apt observation also for a visual representation. The inscription of an event has to be built according to semantics known to all parties involved – a series of symbols put together into an exact grammar. Constructed by these common building-blocks, the inscription is no longer the product of a *single actant*, but a hybrid created from the silent negotia-

tion with *all actants* in the network, even those not physically present (article 7). These actants could be the technology through which the idea is transported (article 3 and 4), the persons the first actant needs to communicate the event to and the various ways in which similar events have been represented at earlier occasions (article 7). Any person, object or concept that mediates the end result and thus transforms it must be acknowledged and counted as an actant (see Latour 2005, p. 39, 128-133).

Let us recount: a visual representation is a construction. Cultural heritage is an argued representation already to begin with. A visual re-presentation of cultural heritage is therefore a re-presentation of a representation. Hence, any visual representation of cultural heritage is, by necessity, a construction two steps removed from what is traditionally called a past. The past is an important and efficient way of referencing time encompassing all that has gone before, but represented it amounts to nothing more than an assemblage of interpreted sources ordered in a linear fashion similar to that of history. History is an argued representation of the past. How can time *not* be folded when everything – cultural heritage, past and history – is layers upon layers of representations originating in the present?

However, I do not champion presentism, a history originating in the present where the past is inaccessible (Grandazzi 1990, p. 65). Contrary to popular belief, the past is *not* a foreign country, or if it is, it is one in our own backyard that we visit daily. To paraphrase Latour and Lowe (2011), the question is not *if* the past is a construction, but how well it is presently assembled. The question is not *if* history is a construction, but how well it is presently argued. The question is not *if* our cultural heritage is a construction, but how well it is presently represented. To represent the practice that is

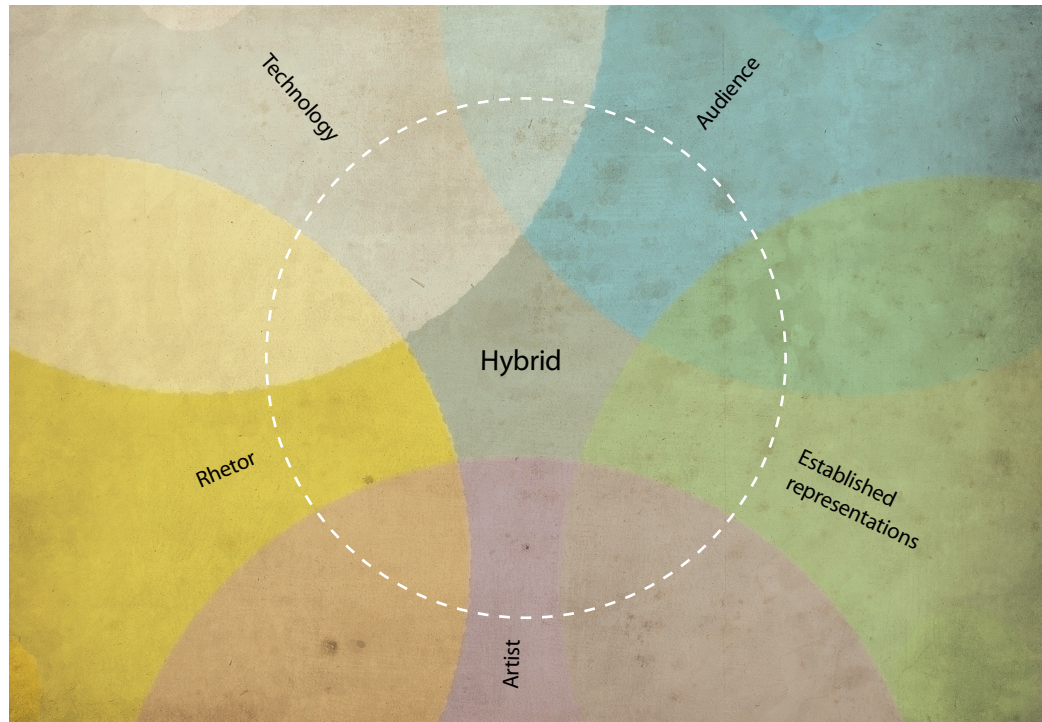
heritage well, all parts making up ‘culture’ must be accounted for. An inscription is only as accurate as the data you feed it – data mined from our current understanding (article 3 and 4).

Latour describes this cross-fertilisation of the present and the past in his fable of three dinosaurs: the Realsaurus, the Scientosaurus and the Popsaurus, all different aspects of the same iguanodon (1980). Though the Realsaurus should be safe tenth of millions of years in the past and unable to be disturbed by anything happening at a present day conference, the protagonist of the fable, a sociologist, found that every time the researchers evolved the Scientosaurus through new theories about how it might have looked and behaved, the Realsaurus followed suit and changed in an equal way. Though the Realsaurus should have spawned the Scientosaurus, the genealogy seemed to be muddled. Reality was *not* a constant, but could be negotiated into a new reality when new scientific ways of describing it appeared. The sociologist’s real discovery was however that the Popsaurus, the popular understanding of the dinosaur spread through images and amusement parks, had a just as strong position in the negotiation process as the other two dinosaurs:

“Back in 1853, the hall of the iguanodon had opened at Crystal Palace : the Iguanodons had a slight resemblance to the ‘scientific’ iguanodons, but real iguanodons were largely inspired by their popular image” (Latour 1980, 85).

In the light of the above – where the inscription is perhaps the most tangible aspect of a scientific result or interpretation of the past – I argue that *new* scientific visualisations are dependent on these very palpable established descriptions (article 7). Indeed, the Popsaurus roars louder than the Scientosaurus, even in the communication between

Fig. 7. **Hybrid.** The result of a negotiation is a hybrid – a mixture of all the actants involved. Being a compromise, the visual representation can appear bland, though only in relation to the unmediated extremes of the actants.



historians and archaeologists, an interchange that one could believe ought to be informed exclusively by current research.

The production of a visual representation is a dialogue, or negotiation, between the rhetor of the visualisation, the artists, the technology, the target audience and all earlier visual representations, where a mutual dependence is present that establishes guiding formulas for how a phenomenon should be communicated (figs. 7 and 8). In the negotiation process, a visualisation can *enrol* earlier representations to a cause, stabilising their common position. By such an enrolment, a new visual representation, by itself lacking associations, can gain traction through other actants more well connected. These earlier visual representations could be described in terms of an *obligatory passage point* – a language or a set of symbols any new visualisation has to express

itself through to associate itself with a certain set of qualities (Callon 1986, p. 202; Latour 1994, p. 37). I explore this in article 6, where I show how properties are enrolled to a format by the proponents of said format. This format, the analogue book, functions as an obligatory passage point through which certain content has to pass to gain these properties. Associations through enrolment are not always logical and often fall apart when examined closely. However, when strong, they function as an equal sign between two or more disparate concepts.

When it comes to the audience's judgment of credibility, the visual generally conveys a sense of certainty much stronger than the spoken or written word (Favro 2006, p. 326; article 2). It brings an illusionary authenticity which overwhelms the rational understanding of the incomplete nature of the reconstruction, something that has led me



Fig. 8. **Perceptivity.** Looking closer, it is in the perceptiveness used to construct and present the hybrid – how the voices of the actants are mixed in and which signifiers are enrolled – that decides the success or failure of the visual representation. Will both the rhetor and the audience accept the visualisation, or do they demand a re-negotiation?

to explore *uncertainty* as a visual methodology when creating visualisations. Law writes:

“To translate is to make two words equivalent. But since no two words are equivalent, translation also implies betrayal” (Law 2007, p. 5).

Hence, there is a need to find ways in which the visual representation can speak directly to the audience about its references and provisionality. Being a non-human, an inscription is durable, since it stabilises social negotiations (Latour 1999, p. 210), but, because of this, it is also less open to re-negotiation. The research presented in article 1 and 2 being explorative in nature, my co-writers and I suggest a series of visual signifiers aimed at offering inroads to question a visualisation – renegotiate it – rather than accept it, and thus make the translation from idea to inscription less of a betrayal and more of a dialogue – the past presented as unsettled as it is in the notes of the ar-

chaeologist and on the drawing board of the artist. The fact *in making* rather than *in existence* (Latour 1999, p. 25). Agreeing with Kennedy’s statement that “the illusion of certainty has done great harm to archaeology” (2006, p. viii), with these ‘levels of uncertainty’ I try to remedy this by including the ability to change between alternative versions of the same scene, to remove all reconstructions, to view the level of certainty on individual objects and to follow the reasoning behind their inclusion in the visualisation. Kalay puts forth the various advantages of digital visual representations, noting that it permits a development and communication of alternative narratives (2008, p. 5ff). This is explored by, among others, Pollini *et al* (2005) and Frischer and Dakouri-Hild (2008). The ‘layer of interpretation’, referred to in the beginning of this section, is through these visual signifiers made visible. Though the past remains displaced – it is

still a visual representation of an interpretation – this visual methodology lessens some of the harm done, and looses some of the shackles put on the interpretation of the past. Naturally, this kind of interactive visualisation is not without a complexity of its own.

A recapitulation of important outtakes from this section: as we model our past in our effort to describe it, a layer of interpretation and focus is added. The visual representation of an event has to be built out of common building-blocks, constructed according to semantics known to all parties involved. As a consequence, the visualisation is no longer the product of a *single actant*, but a hybrid created from the silent negotiation with all actants in the network, even those not physically present. Scientific visualisations could be argued to be dependent on already established descriptions, even though it is a communication that should be guided by research results. Visual argumentation trumps the spoken or written word. To allow for future revisions, the interpretation of the past needs to be presented as unsettled in its visuality as it is in its research, and therefore open to change.

Interlude:

the interactive angle or the imperfect angel

The English word ‘angel’, denoting a powerful winged creature of a higher order and holiness, has a very mundane origin. While it has come to primarily refer to a radiant being doing the bidding of the Christian god – a physical manifestation of god’s voice and power – it stems from the Greek word ἄγγελος (angelos), a word which originally meant no more than *messenger*, an *intermediary* between two communicating beings. Intermingled with the act of representing is the

act of presenting, putting forth an interpretation through the aid of technology, an action often thought to be executed through an intermediary. However, *mediator* is a better description. A mediator transforms the message ever so slightly, either by design with the intention of making the message comprehensible to the target audience, or through the necessity of translating the message through the limitations of the technology or media by which it is communicated. In the introduction to article 2, my co-author Thommy Eriksson and I write:

“Our cultural heritage is increasingly experienced as a virtual heritage, a space, or *realm* as Champion puts it (2008), consisting of representations. Three-dimensional scanning through photogrammetry and laser, virtual reality, augmented reality, photorealistic computer graphics and interactive displays; all these are technologies that in days to come will shape the profession of both archaeology and museology” (article 2, p. 87-88).

The museums nurture a positive wish to position the exhibition as a heterogeneous dialogue – not a homogeneous monologue – where the visitor’s voice is an important aspect of the exhibition and should therefore be engaged. The most fitting instrument to establish this dialogue is often seen to be technology in the shape of the interactive digital display, “increasing the opportunities for democracy”, as Taxén puts it in his thesis on participatory design in museums (Taxén 2005, p. 17). While the technology in the network seemingly allows action, therefore being a productive force, it is its capacity to forbid action – to limit – that makes it an interesting actant we can follow. These limitations shape our interaction with what is presented through the representation in the virtual space of the display, and decide what can and what cannot be expressed (article 3 and 4).

As visual representations become interactive, another layer is added to the interaction between the rhetor and the target audience, or *interpreter* in the parlance of Kress (2010, p. 42). Foucault proposes a for my thesis apt description of interaction as the relation between two subjects in a structure that relentlessly transforms one of the subjects into an object, measured and observed by the remaining subject. To understand the power relations exercised through this interaction, we must first return to the concept of ritual, briefly mentioned above, and Foucault's theory of a discourse only accessible to some:

“This amounts to a rarefaction among speaking subjects: none may enter into discourse on a specific subject unless he has satisfied certain conditions or if he is not, from the outset, qualified to do so. More exactly, not all areas of discourse are equally open and penetrable [...]” (Foucault 1971, p. 224).

Just as a carpenter has a specialised language, so has an academic, and those not fluent in this vocabulary are deemed unqualified by the experts in the field. This is a vocabulary not limited to text and speech, but it also includes body language and artefacts. The authorities, present in any field and any communication, evolve the vocabulary to make it more exact, and are in this act of creating specialised rituals excluding a wider group of people.

In the scientific community, knowledge becomes separated from practice – what Aristotle called τέχνη (*techne*) in book six of the *Nicomachean Ethics* – since a different, communicative, skill-set is required to share the practical know-how (*Nicomachean Ethics* VI). *Techne*, the craftsmanship, is thus *mediated* into knowledge through the necessity of expressing a silent know-how through a representational vocabulary reproducible in text and speech. The difference between *techne* and

scientific knowledge compute to the difference between *knowledge of acquaintance* and *knowledge about*, first distinguished by Grote but later re-phrased and popularised by Russel as *knowledge by acquaintance* and *knowledge by description* (Russel 1911). The academic shoulders the role of interpreter, or *describer*, of *techne* and as such functions as a filter through which know-how has to pass and be mediated before it is allowed to enter the scientific debate. Archaeology moves from practice to scholarship only when it is expressed in an academic manner, even though important nuances are lost when translated from acquaintance to description. Different vocabularies, skills and tools are used by those *working* in the trench and those *writing* about the activities in the trench, even if they often are the same person. In these relations between scholarly and non-scholarly activity, the communicative dialogue becomes fragmented since it can now be attributed a high and a low level.

According to Habermas such a development puts an increasing number of the population in a client position towards those few ‘experts’ who are entrusted to communicate at the higher level. This results in a *colonisation* of the scientific debate by a limited group of people with a homogeneous academic background (article 1). Since rituals are formed around the tradition of the already accepted, and those who are unable to meet the demands of the rituals are left out, it leads to a homogenisation of vocabulary, manners and background. This colonisation of the scientific debate amounts to a milieu where there is a discrepancy between subject and object, a development which has resulted in a situation where the expert within a given field – the person made heard in the scientific debate – does not have to be familiar with the practical implications of the craft. A Ph.D. in

art history, photography or visual communication does not have to excel in the creation of original art, or even master its fundamentals. Different skill-sets are required to create art and to create *knowledge about* art. As a consequence, to establish herself as an authority and expert, it is not necessary for the practitioner to continue to excel at her practice. However, she must learn to master the academic rituals of mediating *techne* into scientific knowledge and thus become part of an institution. Focusing on the institution as a source of authority, Foucault draws his example from the traditional role of the medical doctor:

“In the eyes of the patient, the doctor was a miracle worker, and the authority that he borrowed from order, morality and family he now seemed to derive from himself. It was as a doctor that he was believed to have such powers [...]” (Foucault 1965, p. 508).

Sprung from the subject-object relation, a specialised language is developed which, by rephrasing the vocabulary of know-how into the vocabulary of scientific knowledge, excludes the patient from the communication, denies the same patient access to the debate and lends the subject authority. While power, according to Foucault, is a productive force all about social relations, the interaction between humans, this reasoning can be expanded to include also non-humans. Rewritten as to include the material realm, power can be described as manifesting itself in the relations between actants as they interact naturally and within institutions, creating associations and enrolling allies into an expanding network. Accordingly, interaction and power-play is broken down to an individual level, emphasising the uniqueness of every actant assembled, whether human or non-human.

Not as compatible with a flat ontology consisting of both humans and non-humans in negotiation, but still on a related note, there is the notion put forth by Habermas that communication is at the centre of social development (1981). Habermas treats the rational dialogue, the *communicative rationality*, as a process where all participants are to win by a mutual exchange of ideas. An agile and heterogenous power is created, questioned and transformed through social confrontations.

In this hierarchy, power is the right to be made heard, a right regulated through the rituals of the structure and the rituals of communication. This structure, though being a product of relations within institutions and originating in human presence, is also present in the interactive space – a communicative space often thought to be configured as to *share* the power and make the voice of the non-expert heard (Taxén 2004; article 1-3). The old rituals – giving authority to those able to communicate in an academic manner and follow rigid conventions in how, and where, to formulate their message – are replaced by a form just as authoritative and excluding. I have explored these relations at length in the context of interactivity in article 3, and also their practical implications in the follow-up article 4, both summarised above. By describing the inner workings of an interactive digital display and an educational computer game, I argue that although these participatory technologies are aimed at improving communication and education, they are above all else a disciplinary force – an impoverished realisation of a two-way communication brought on by an unchecked technology-deterministic way of thinking.

“The interactive practice is dualistic; albeit it is possible to promote different strands of historical interpretation, and subsequently memories,

like any representation it functions as a solidifying instrument that disciplines the actant into a series of predetermined conclusions” (article 3, p. 100).

My take on interactivity, though grounded in a technical know-how, is humanistic in its approach, putting focus on the movements and restrictions of a human body. Every artificial limitation put on this human body is disciplining, since it limits possible expressions. The analogue body, as a cultural instrument, functions both as a receptor and a transmitter. To transmit is to act or react. By arguing the concept of action and reaction as acts of transmission in the digital sphere, we can determine what restrictions are placed on the analogue body in a two-way communication (article 3). For an audience to participate in a digital interactive exchange it must enter the interactive space (fig. 9). This space is defined by those constructing it. It may be in the form of a game, a hypertext structure or an image where you can exchange different elements. Even so, you can never act in the interactive space; only choose between a series of pre-defined re-actions. The natural movements of the analogue human body is in this structure limited by the digital borders. Power *is* the right to be made heard, a right *seemingly* offered the audience through the interactive space. However, since the audience is unable to make their own voice heard, power still belongs, effectively, to the rhetor, the instigator, even though important answers may lay silenced within the audience. The rhetor, though not necessarily more informed than the audience, remains uncontested.

In short: interactivity is not about releasing power, but about deciding what can be expressed and how to mask it as freedom. This is not the rational dialogue of Habermas, nor a conversation, but a formula. While digital interactivity can be used to

navigate conflicting themes, to choose from available versions of stories and browse a variety of media representing aspects of these stories, it is in its current form the limited freedom of reaction, not action. Interactivity caters to the body's function as both a receptor and a transmitter, but, while it stimulates reception, it allows only reactions to transmit and not actions. The interactive setting constitutes a closed space where the actant is only free to transmit within the borders and limitations of the interactive space (article 3).

To achieve a *generalised symmetry* in the description of the various actants in an interaction, it often helps to treat all actants as if they truly *were* anthropomorphic – a much more humanistic approach than to treat all actants, humans and non-humans alike, as dead matter. Consider the interactive space as an anthropomorphic *Messenger*, moving between the *Rhetor* and the *Audience*. The Rhetor wishes to ask the Audience about its opinion in a certain matter and informs the Messenger about this through a process we call *Visual Representation*. The anthropomorphic Visual Representation knows, however, that the Messenger is not very agile of mind and that the Audience is tough: low on attention and high on opinion. Additionally, the Audience is preloaded with old information, images and incomplete truths.

Afraid that the Audience will try to trick the Messenger, or that the Messenger will not be able to catch the interest of the Audience, the Visual Representation asks the Rhetor to formulate as clear a message as possible. A clear message with clear answers. The Rhetor ponders this request and, knowing all too well the limitations of the Messenger, starts to cut away at the initial question, simplifying and streamlining it. The Visual Representation takes this new message and translates it further,

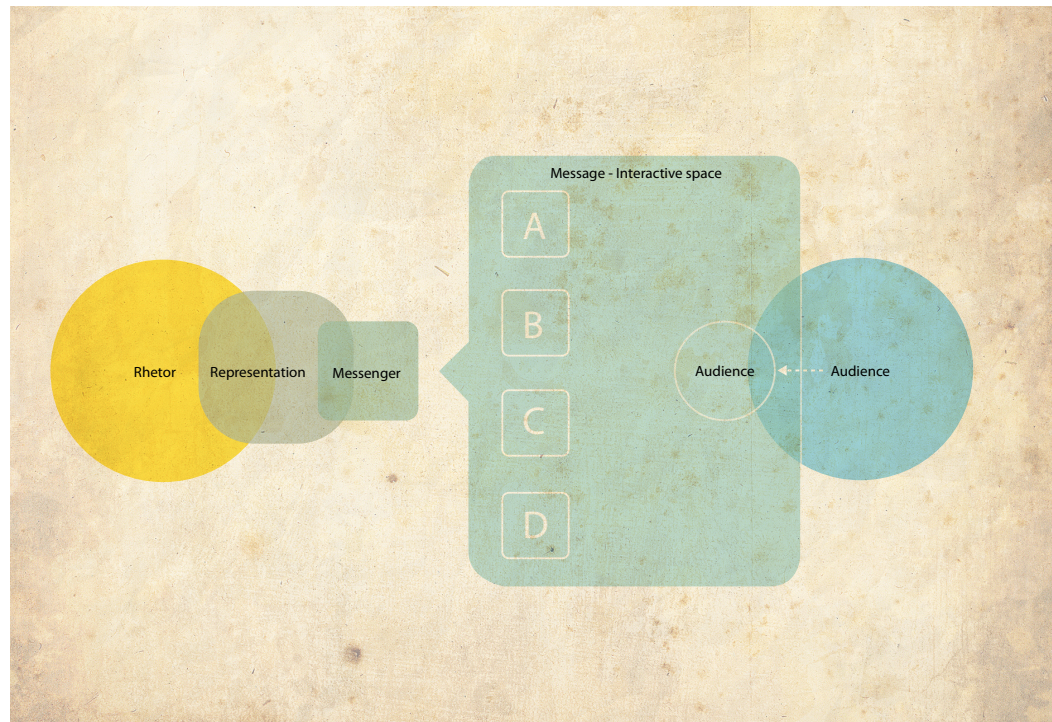


Fig. 9. **Interactivity.** The original message of the *Rhetor* transformed step by step by *Visual Representation* and *Messenger* into a form accepted by *Audience*, which moves into the interactive space to be able to voice a prefabricated opinion.

lending building-blocks from both the Audience and earlier representations – colours, shapes and names – through which the message is assembled (figs. 9 and 10). He structures it, gives it a hierarchical disposition. Working closely with the Messenger, the Visual Representation knows all too well that he must also supply choices for the Audience, prefabricated answers, lest their opinions will be lost to the often absent-minded Messenger. The Messenger sent to the Audience, the Rhetor asks the Visual Representation:

“Why did we do this? The message is simplified beyond recognition and twisted through old concepts we left decades ago. On top of this, we cannot learn something truly new from the Audience, since all the answers you allow are already known to us”.

“It is what we always do”, answers the Visual Representation.

I re-iterate, *power is the right to be made heard*, a statement that renders the interpreter powerless in direct communication. However, to understand the full scope of interaction between rhetor and interpreter, we must leave the notion of direct communication as the only source of influence and embrace the initially described target actant, the actant of the network, which silently forms the message simply by being the *adressé* of the instigator. The silent actant.

A recapitulation of important outtakes from this section: technology in the shape of the interactive digital display is often seen as the most fitting instrument to establish a dialogue with the visitor. As visualisations become interactive, another layer is added to the interaction between the rhetor and the target audience. Power is the right to be made heard, a right regulated through the structure of this interactive space. Although participatory

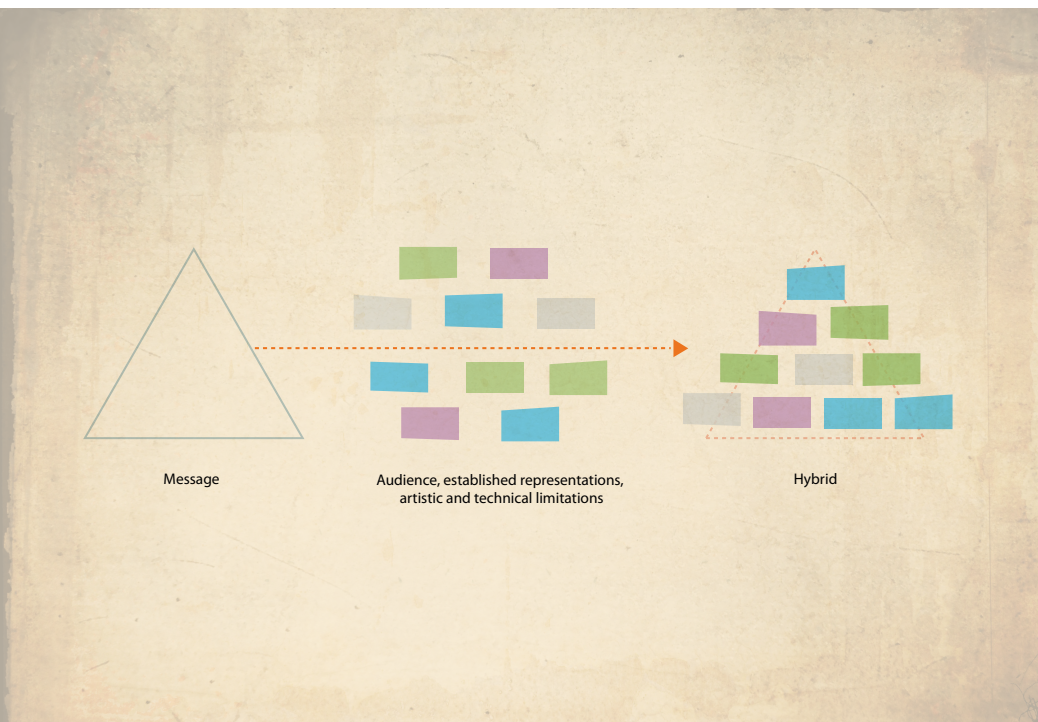


Fig. 10. **Translation.** A message is translated through the concepts of the audience, established representations and technological limitations into an accepted hybrid realised through the building-blocks provided by the network of actants.

technologies are aimed at improving communication and education, they are above all else a disciplinary force, as the interactive space is defined by those constructing it. This leaves the user to choose between a series of pre-defined re-actions, not actions.

**The voice of the silent actant 1:
the prologue revisited**

“Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under given circumstances directly encountered and inherited from the past. The tradition of all the generations of the dead weighs like a nightmare on the brain of the living” (Marx 1978 [1852], p. 9).

The two scenes in the prologue of this thesis describe two distinct visual representations – one of a Forum Romanum alive with colour and activity, and one of a stylised ventricular system in the hu-

man brain. In my narration, the first one, though scientifically sound, loses the audience through miscommunication, while the second one, operating through idealised descriptions rather than mimicking the physical reality, reinforces a visual language and upholds the communication. At the heart of these outcomes, where visual representations of an artefact, phenomenon or event either bend to earlier visualisations thereof, or lose credibility, is the use of symbols.

Though not limited to the visual, these symbols are, in the terminology of semiotics, *signifiers* which are used to realise meanings, or *signifieds* (Kress and Leeuwen 2006, p. 6; Selby 2010, p. 41). To the dismay of the visitor, the components that *ought to* have populated the visualisation of ancient Rome are not to be found. The blue sky, the white walls and the unbroken lines – these are signifiers which convey Antiquity as effective-



Fig. 11. **Signifiers.** Two different views from Basilica Aemilia, winter 754 *ab urbe condita*. One is more uncertain than the other.

ly as the red hexagon with its twisting tail communicates a viral vector (article 7). Additionally, elements which according to the visitor *ought not to be there*, such as the wooden structures and bronze ornaments, move the scene to later times and other places, be it Renaissance Florence or nineteenth century Paris, suggesting that Antiquity is largely an image in the eye of the beholder. Hence, an inscription is never neutral but occupies the same mind space as the material remains, shaping both how we perceive an event and how we expect an event to be presented to us.

A common technique of visual representation when dealing with the uncertain is to silence it, and only include that which there remains material evidence of. Accordingly, though born in ignorance, the recurring visual signifiers of Antiquity are not upheld by a certainty of unbroken lines and white walls, but by the uncertainty in

how those lines were broken and *how* the walls were adorned (article 7). The popular idea of Antiquity has thus come to be built with white marble and stone – not wood, bronze and colours – an idea *performed* in scholarly representations that take care not to speculate. To communicate Antiquity efficiently, and without speculation, the scene must be reduced to its marble core, and everything deemed uncertain be negotiated away (fig. 11). However, such visualisations are easily read as complete, as though the walls really were unadorned or the empty spaces really were unfilled, since they contain no markings of what is represented and what is *not* represented due to uncertainty (article 2). Brought on by the inseparable activities of heritage manufacturing and the consumption of tradition, this creates a reverse flow of cultural capital (Alsayyad 2008). Simply put: we are replacing the past with an inscription

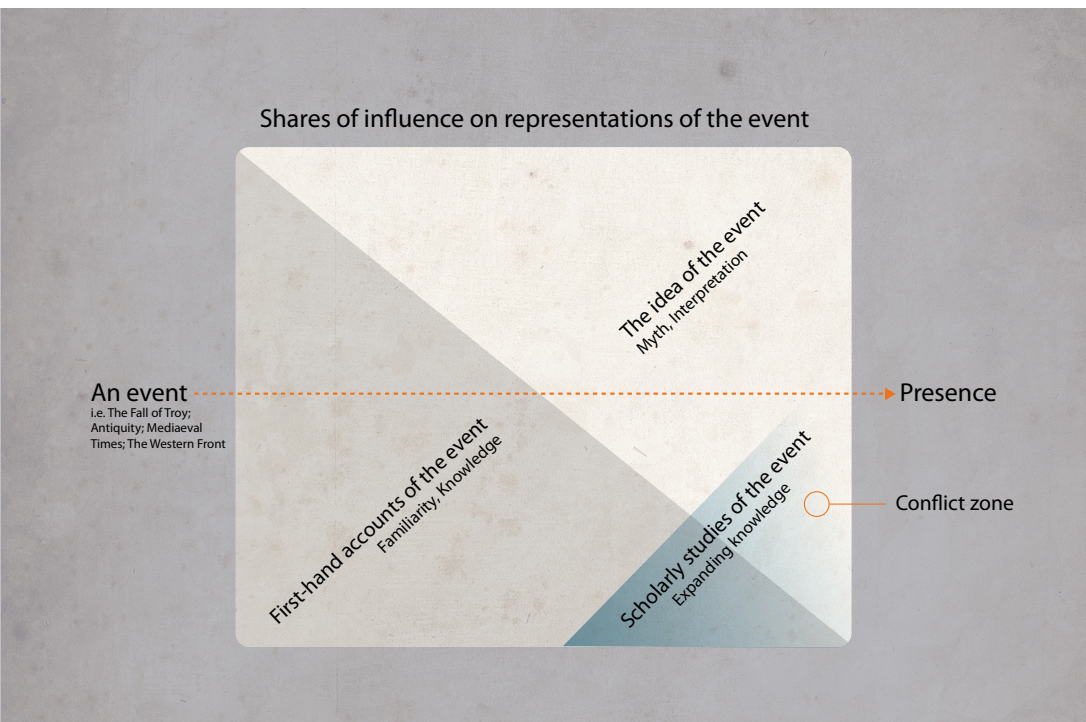


Fig. 12. **Conflict.** As the *scholarly studies of the event* and the *idea of the event* lay claim to the same area of interest, all representations have to be negotiated.

of the past, assembled from present material remains. This is an inscription whose stakeholders are numerous, and it needs to be negotiated with when new visualisations are created as it contains those common building-blocks used to assemble historic scenes.

This negotiation between new visualisations and established inscriptions occurs naturally during the procedures that form the basis of any visual representation of historic times – a process generated by the tension created from the discrepancy between the knowledge about the historical event, accumulated through research, and that of the popular idea of the event. As figure 12 illustrates, over time, as first-hand accounts grow scarce and knowledge and familiarity is substituted by interpretation and myth, any historical event will increasingly be defined through representations informed by the *idea* of said event, itself a product of both representa-

tions and material remains. Were the knowledge about the event to grow, through scholarly studies and research, the representations produced by this research – both visual and non-visual – would soon find themselves in conflict with the representations informed by this idea of the event.

Antiquity's presence in day to day life has been in decline, but inscriptions informed by the idea of Antiquity, however misinterpreted, has filled in the gaps and become an event in itself, now in conflict with the awoken scholarly knowledge about this particular time period. 'Culture' has, through all its ties, come to be synonymous with the inscription informed by the idea, rather than the event itself. As a consequence, any diminishing of this idea in favour of knowledge about the event would be a diminishing of 'culture', since many ties would be severed (article 5 and 6). Put another way: the event's origin has been dwarfed by its legacy, and its career has

been built with ideas rather than knowledge. This career, through which the event amasses ‘culture’, can be partially traced through the vocabulary of limitations (article 5).

Entering the Conflict zone, a space laden with myth, visualisations informed by *knowledge* have to negotiate with those informed by the idea. To connect with the audience, and be part of ‘culture’, any new visual representation must relate to those inscriptions that make up the idea of the event. In the terminology of ANT, a detour is taken to “capitalize on the force of nearby actants” (Harman 2009, p. 19). This is done either through emulation of established symbols, as in the case with the hexagon symbol representing the viral vector, or by showing a partial kinship through colour or form (article 6). Put yet another way: To convey the signified, the sign-maker chooses signifiers from the semiotic vocabulary of the target audience (article 7).

New research, as in the example with the cell-migration process, must be communicated through established concepts, known to the audience and part of the visual representations informed by the idea, even if these concepts would threaten the integrity of the research. As Moser notes, within the field of archaeology, the scholarly community is not immune to the popular realm and “the forms and media used to communicate our work have a significant impact on the ideas we have about the past” (2001, p. 263). Kress and Leeuwen, from the field of social semiotics, argue that we are constricted by ‘culture’ in our semiotic expressions, since “we have available the culturally produced semiotic resources of our societies, and are aware of the conventions and constraints which are socially imposed on our making of signs” (2006, p. 12). Reading ‘culture’ as a catch-all phrase for a variety of expressions, including established visual

representations enrolled by the idea of an event, I share this view. I reason, as exemplified above, that inscriptions which have gained a broad acceptance by their intended audience, such as those of the white Antiquity or the hexagonal viral vector, shape later visualisations and thus limit what can be expressed since they constitute “a barrier to ‘objective study’” (Wilson 2010, p. 81). Any new visualisation of Antiquity has to stand in relation to the idea of the ancient world and the countless established visual representations this idea has enrolled, and is bound to be affected by those, just as any new visualisation of neurodegenerative diseases must stand in relation to earlier visual representations thereof.

The network which makes up all the actants of the procedure involved in making an inscription, prevents the result from drifting too far from the audience’s understanding of the event represented, even though this understanding may very well be factually wrong. Gibbons writes that “it is necessary to begin by describing the characteristics of the new in terms of the old” (2011, p. 2), an observation I echo in my studies: communication is always about connecting through a common frame of reference, and to communicate one has to speak a language the target audience understands. Bowra notes in his introduction to Finley’s *The World of Odysseus* that the world Homer described was “composed for his contemporaries, and the picture which he gives of life on Ithaca had to be made intelligible to them as akin to their own” (1956, p. 11). Likewise, within the field of linguistics, Metcalf writes that “as a general rule, a language allows new words only when they resemble familiar ones” (2011).

This holds true for communication using visual means. The ‘White Antiquity’, even though it is

Fig. 13. **Colours.** The *Knowledge* of Antiquity and the *Idea* of Antiquity, briefly made to exist simultaneously at Museo dell'Ara Pacis, Rome. The marbe of the altar is coloured through the use of light projectors (montage).



misleading, is a description of Antiquity that has numerous ties to the networks making up the functions of society. Smiles and Moser write that “images of the past survive longer than the theories they were designed originally to support; they linger on in museum displays, as illustrations in archaeologically orientated books, and as part of popular culture” (2005, p. 5). This is one reason it has proven so hard for the “Coloured Antiquity” to get a foothold in popular visual representations. Even though it has been known among scholars for three hundred years, visual representations of painted statues and temples still lack broad support in the Conflict zone (see Frizell, Santillo 2010; fig. 13). They are hindered by the familiar descriptions all around us that keep telling us the ancient world was white, a situation that computes to the ANT adage that the more connections an actant has amassed, the more real it appears and is therefore harder to challenge. Conse-

quently, any new inscription of history that wishes to efficiently communicate a particular time period, must, to be accepted, bend to the idea of that time period, the unwritten rules of how it should be represented (article 7).

The above treated discrepancy between the scholarly community’s knowledge of Antiquity and the inscriptions produced in the tradition of the idea, could result in a belief that there exist two ancient worlds; one actively researched but seemingly unable to make a mark in this world, and another one informed by outdated ideas but forever part of our worldview. This worldview – kept alive through later architecture, art and both popular and scholarly visualisations – must be taken into account when we represent ‘culture’. Myths, misinterpretations and misconceptions make up just as great a part, if not greater, of our cultural heritage, as any objective idea of truth. This raises questions about what

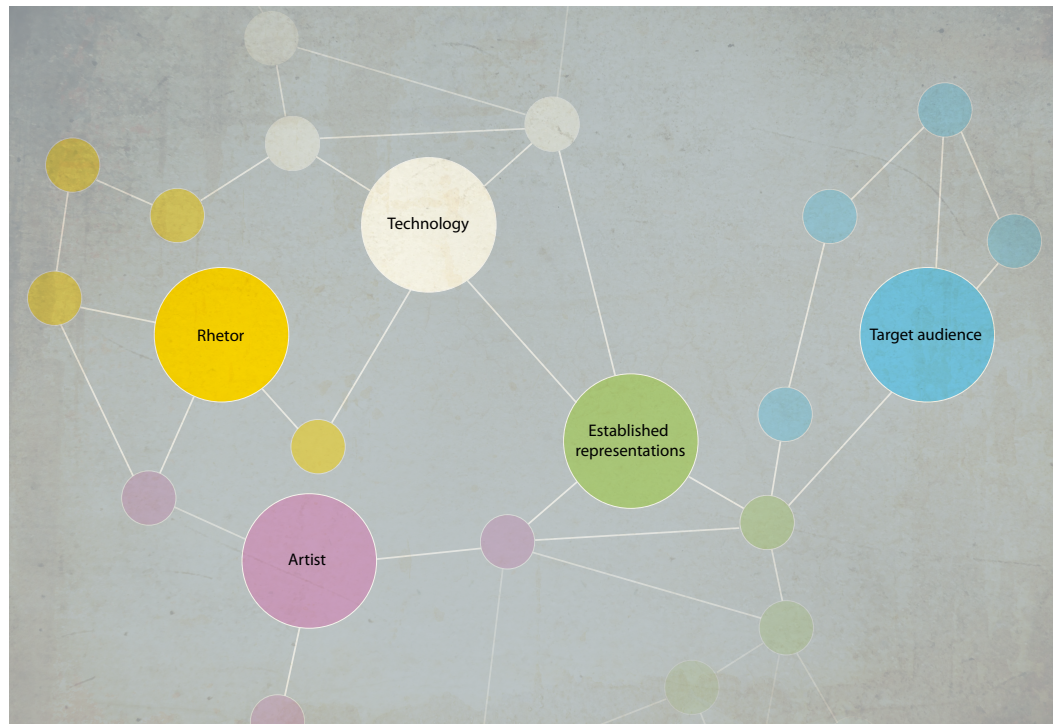


Fig. 14. **Mediation.** There is no natural venue of communication between the rhetor and the target audience. For the message to be made mobile, it has to be given form through a series of actants, which all mediate the inscription; the visual representation.

to convey and preserve as cultural heritage through new visual representations – a research-backed narration of the past which has made no impression on the public, and therefore has not generated any qualities, OR the general perception of what the past was like, something that has shaped artistic and social expressions, although built on premises deemed wrong? As Selby writes: “in the case of cultural heritage, the majority of the stock of knowledge will have been acquired through mediated sources (representations), and only when visiting a heritage site will individuals share the same temporal and spatial zones” (2010, p. 48). Since first-hand visits to an objective past elude us, mediated sources must remain our common ground.

A recapitulation of important outtakes from this section: popular visual representations, regardless of discipline, constitute a context and a starting point that all communication has to stand in relation to.

New concepts must be presented in a comprehensible way and are therefore made recognisable by being mixed up – or watered down – with old concepts now part of our worldview. The new, or *young*, is in constant negotiation with the old. When we communicate the past through visualisations, this negotiation becomes a guiding force that has great influence on how the ancient world is represented and received, and how well it conveys a sense of ‘culture’. Had the researchers attempted a verbatim visual representation of the viral vector, instead of using an accepted signifier, the communication would have failed. Consequently, the visualisation of Antiquity – devoid of those symbols that have, through social semiotic processes, come to signify Antiquity – leaves the visitor bewildered and the visualisation abandoned. Something has been lost instead of gained. The depths of ‘culture’ have not been represented, and the negotiations in the Conflict zone have broken down.

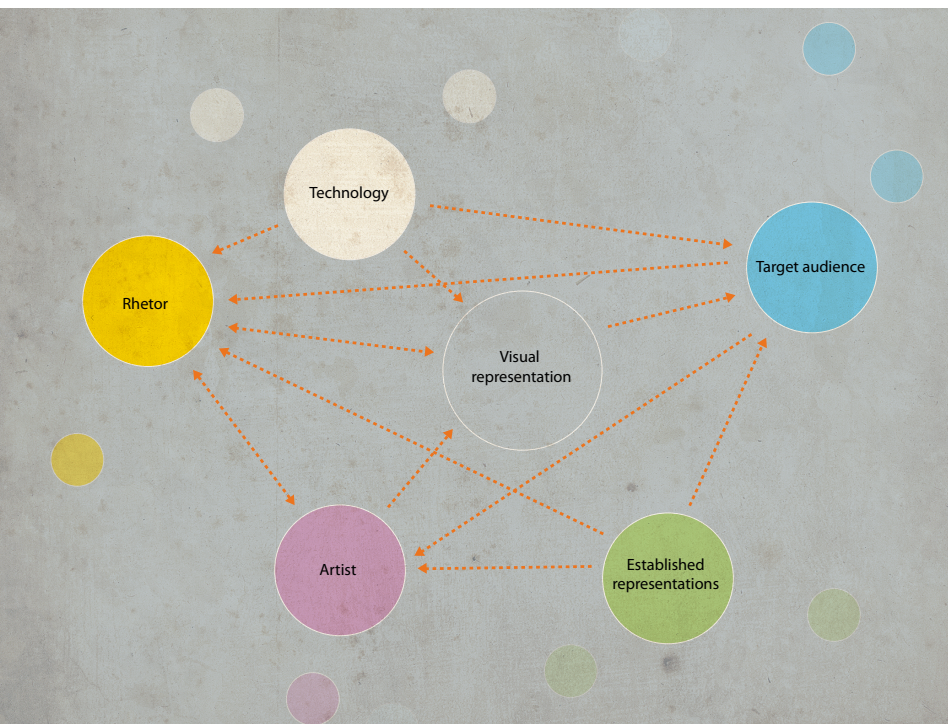


Fig. 15. **Interchange.** Mediated by a host of actants, a visual representation is a product of a network of actants where influences are flowing in all directions. It is therefore not the means of a one-way communication from rhetor to target audience, but the scene of an interchange.

The voice of the silent actant 2: the old network

In the previous sections, an idea has travelled between instigator and interpreter, and been transformed while given form through the use of signifiers and the realities of technological limitations. A visual representation has been laid out to be a network of actants, where influences are flowing in all directions. Not just left to right, from rhetor to target audience through the visualisation, but also from audience to artist, technology and rhetor, meaning that the actants of the network are not either senders or receivers, but both (figs. 14 and 15). However, while the implications of a visual representation being a network which flows in all directions have been ever present in this summary, the influence of the audience in the practical procedures resulting in an inscription remains to be addressed in an explicit manner.

I call the audience a ‘silent actant’ and, like the currents born of limitations, this is an actant that transforms other actants even when not physically present. Although the target audience is not allowed a seat in the meetings, and lack access to the floors of the studio, therefore seeming to remain silent, I argue nonetheless that – as a group – its voice *is* heard during the assembling of a visual representation, and this in a more profound way than any interactive exhibition technology permits (as discussed in article 3 and 4).

In article 1 and 2, the audience is met through images in an effort of communication and democratisation. Theoretical research is made tangible by being given form. To make concepts recognisable for what they are, they are dressed in common symbols, and the signifiers used to convey uncertainty and context are chosen on the merits of the audience being able to recognise them. In article

3 and 4, the infinite number of choices available to the scholars are reduced to a small handful the audience is able to process and choose from. Metaphors, and through these a shared frame of references, are used to communicate the abstract. In article 5 and 6, artefacts, phenomena and events are judged by properties inherent in the presentation more so than on their merits. The sense of ‘culture’ is instilled in different formats by the audience, a consequence of the impact these formats have had on social institutions through their limitations. Since cultural heritage is a representation to be-
gin with, recognised by the audience, new visual representations must represent this established representation – presentation conventions and all – rather than origin or current research when communicating properties intended to be recognised as ‘culture’ by an audience.

Finally, in article 7, I propose that all the practical procedures involved in the creation of a visualisation are shaped by negotiations with a silent, but still present, target audience. New research is, time and time again, dressed in the shapes and colours of popular visual representations, in order to be recognised by – and able to communicate with – the interpreter. To make inroads into the aforementioned Conflict zone, and establish new images and symbols, there must first be a negotiation with those signifiers which are championed by the audience.

The recurring theme is that the audience, as a group, is part of any network creating visual representations, and thus mediates all output. This differentiates my view from that of Baxandall, whose three agents – *Maker*, *Exhibitor* and *Viewer* (1991, p. 36-37) – simply represent three different ways of interpreting and approaching an artefact, coloured by context and understanding.

Additionally, Baxandall’s *Exhibitor* directs the *Viewers* focus, but does not let himself be directed by the *Viewer*, a one-way communication I argue to be impossible. In article 7, I conclude that neither client nor scientific results are by necessity the most influential actants in this network. As the idea passes through the various actants, it is translated through a worldview supported by the rich material of established representations, encompassing not only the target audience and the artists, but the client and the archaeologists as well. *Worldview*, of course, harkens back to the definition by Alpers outlined in the beginning of this summary.

All the visual representations to which the audience has been exposed to have become a past in themselves, the past of the audience. It must therefore be treated as a real past, as real as that suggested by *current* research (article 7). As knowledge meets idea in the Conflict zone, any visualisation is a translation of this meeting, the result of a negotiation moderated by the audience.

Conclusions

In this thesis I have argued that successful visual representations – both popular and scholarly – are by necessity as much representations of earlier, established, visual representations as of current research. Even though scholarly communication should have the research at hand as only source, the techniques of visual representation translate an idea into inscription through an established language made up of these earlier visualisations, an act that both performs and shapes our worldview. This observation has functioned as a stepping stone for my research on how visual representations are constructed and what actants are involved, something which has brought me to different constellations of actants assembled to produce and com-

municate the past: interactive displays, museum exhibitions and visualisation studios. In the study of these actant-networks, the practical techniques of visual representation have been the focus, giving new insights into the processes of communicating research through common symbols and established representational concepts.

To identify a wider set of non-visual actants in these highly visual processes, I developed what I have come to call a vocabulary of limitations, a method of bringing attention to properties spawned by the different contexts of an artefact or phenomenon, both in space and time, which may affect present visual representations. Limitations make up the borders of an expression and as such they draw associations, creating ties which are eventually assembled into the concept of 'culture'. I here propose the term *currents* to describe these qualities, which, while originating in materiality, are the intangible actants in a network. These currents, often consisting of connotations and values sprung from limitations, are the soft actants in the plasma which surrounds the hard materiality of a network. This method also serves to expose some of those actants which are required to be enrolled in any visualisation that wishes to communicate 'culture', a concept I argue to be constructed out of parts. So constructed, any visual representation that tries to capture 'culture' through no more than visual imitation, will remain a flat backdrop. To gain texture and volume, all those soft actants that make up 'culture' must be identified and accounted for in the visualisation.

Furthermore, I have explored various ways of establishing uncertainties in representations, and analysed the interactive media as a tool to let the audience explore different interpretations and

make their voices heard. An argumentation made through visual media eclipses the written or spoken word. Therefore, to allow for future revisions, this calls for the past to be presented as unsettled in its visuality as the research it is based on, and therefore open to change. However, while the interactive medium supports a pluralistic approach to narrations of historical events and places, and thus perhaps softens those structures that make up the interpretation of the past, it is not a tool that allows the users to voice their own interpretations and question the visualisation. Instead, another layer is added to the interaction between those communicating. Although the aim of participatory technologies is to improve communication and education, they are nonetheless a disciplinary force. As the interactive space is defined by those constructing it, the user is left to choose between a series of pre-defined re-actions, not actions.

Yet, though the individual users remain mute in the interactive settings supposed to give them voice, and even though it is easy to believe them to be silent, the audience as a group is heard in all the networks I have studied. As a visual representation of an event has to be built according to semantics known to all parties involved, it is, as a consequence, no longer the product of a *single actant*. Instead, it is a hybrid created from the silent negotiation with all actants in the network. Even those, like the audience, not physically present. Visual representations constitute a common frame of reference that all communication must stand in relation to. As such, new discoveries have to be dressed in the rags of the old. When we communicate through visualisations, this negotiation with established symbols becomes a guiding force that has great influence on how the inscription is assembled, and how well it conveys a sense of 'culture'.

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