



**Palimpsests of Im-Material Assemblages Taken Out of Context: tracing Pompeians from the void into the digital**

Journal:	<i>Norwegian Archaeological Review</i>
Manuscript ID:	SARC-2015-0003.R2
Manuscript Type:	Article
Date Submitted by the Author:	19-Aug-2015
Complete List of Authors:	Reilly, Paul; University of Southampton, Department of Archaeology
Keywords:	Absence, Additive manufacturing, casts, materialization, ontology, Pompeii, pseudomorph, skeuomorph, substitutions, voids

SCHOLARONE™  
Manuscripts

Pre-Review Only

Revised Manuscript

## Palimpsests of Im-Material Assemblages Taken Out of Context: tracing Pompeians from the void into the digital

Paul Reilly August 19<sup>th</sup> 2015

Department of Archaeology, Faculty of Humanities, University of Southampton,  
Avenue Campus, Highfield, Southampton, SO17 1BF, United Kingdom

Email: [p.reilly@soton.ac.uk](mailto:p.reilly@soton.ac.uk), Tel: +44(0)1794-341961

### Abstract

This paper explores some ontological aspects of archaeological voids and enclosures together with their translations and substitutions, and considers the nature of spaces within material archaeological deposits and artifacts. The dematerialized and rematerialized bodies of the victims of Vesuvius in C.E. 79 are reappraised as a case study. By problematizing the voids we are able to think critically about the ontological status of the victims' persistent traces and residues. Specifically, using Gavin Lucas's grid of forces models, we explore how these traces and residues have been transformed into different kinds of objects, including, most recently, rematerializations in the digital, through their on-going intra-actions within the domains of archaeology, museology and additive manufacturing. Through this analysis the ambivalent nature of these traces and residues becomes more sensible.

**Keywords:** absence, additive manufacturing, cast, materialization, ontology, Pompeii, pseudomorph, skeuomorph, substitution, voids

"There is no erasure finally. The trace of all reconfigurings are written into the enfolded materialisations of what was/ is/ to-come" (Barad 2010, 264).

### Introduction

Surfaces, interfaces and unconformities have a special status in the archaeological record. Marking boundaries and delineating transitions, they also present a unique aesthetic peculiar to the trenches. Archaeologists like to survey, photograph and draw them prior to making a new, hopefully equally pleasing, or intriguing, surface when they have finished excavating, that is dematerialising, the context or feature. The contexts themselves, however, are more complex and draw attention to the concept of boundedness; inside and outside. Boundedness poses some problems to conventional understandings about the nature of the archaeological record in the case of the excavated material being composed of immaterial, interior spaces or enclosures (e.g.

Revised Manuscript

1  
2  
3 Ingold 2007). As Severin Fowles observes, “packed between the multitude of  
4 self-evident things, are crowds of non-things, negative spaces, lost or forsaken  
5 objects, voids or gaps – absences in other words, that also stand before us as  
6 entity-like presences with which we must contend” (Fowles 2010, p. 25).  
7

8  
9 Sometimes a bounded space denotes the interior of a place, such as a  
10 hypogeum, catacomb, or mine, or the worked inside of a hollow artifact like, for  
11 instance, a *bullae*, a Neolithic and Bronze Age Sumerian accountancy technology  
12 in which clay tokens were sealed within clay envelopes. Juxtaposed to these  
13 products of human agency are negative spaces, or voids, the results of natural  
14 agency, delimiting exterior boundaries of a dematerialization. Although  
15 immaterial they sometimes persist as a profoundly intransigent absence-  
16 presence or, as Sibel Horada puts it, a “polyvalent lacuna” (Horada 2014). The  
17 cavities left by the unfortunate witnesses to, and victims of, the cataclysmic end  
18 of the Roman town of Pompeii being a classic example.  
19

20  
21  
22 This paper aims to explore some ontological aspects of archaeological voids and  
23 enclosures together with their translations and substitutions, and considers the  
24 nature of spaces within material archaeological deposits and objects. The de-  
25 materialised and rematerialized bodies of the victims of Vesuvius in C.E. 79 are  
26 reappraised as a case study. By problematizing the voids we are able to think  
27 critically about the ontological status of the victims’ persistent traces and  
28 residues<sup>1</sup>.  
29

30  
31 I start by describing the circumstances that led to the creation of this enigmatic  
32 assemblage of victim traces and residues, and provide an account of their  
33 subsequent reiterations in different media to the present time. Next, I develop  
34 Gavin Lucas’s ‘grid of forces’ ontological framework for defining objects and  
35 events in order to gain insights into the changing nature of the various  
36 instantiations of the victims of Vesuvius in this extending assemblage.  
37 Specifically, I explore how these victim traces and residues have been  
38 transformed into many different kinds of objects, each with their own  
39 biographies, to create a fluid assemblage of shifting meanings that extends from  
40 the volcano’s deadly eruption through the present and into the future. I draw  
41 attention to the sometimes slightly, and at other times radically, different  
42 rematerializations that emerge as we and our constantly changing apparatus,  
43 techniques, methods, tools, and theoretical assumptions intra-act<sup>2</sup> with one  
44 another, particularly as they become entangled with the digital, within the  
45 domains of archaeology, museology and additive manufacturing. Through this  
46 analysis the ambivalent nature of these traces and residues becomes more  
47 ‘sensible’. Some ethical issues are also raised concerning the treatment, trade  
48 and display of these remains of human beings.  
49

### 50 51 52 53 54 **Suspended Moments**

55  
56 The victims of Vesuvius have been subject to several centuries of near  
57 continuous investigation, appraisal and wonder. This extended engagement at  
58  
59  
60

Revised Manuscript

1  
2  
3 Pompeii presents us with an opportunity to reflect on the ontological multiplicity  
4 of a multifaceted, "dynamic assemblage" (see Fowler 2013).  
5

6 For some these human<sup>3</sup> forms-cum-voids -bodies lacking almost any corporeal  
7 remains- are more or less empty moulds. For others, they are full of human  
8 existence, reservoirs brimming with mortal despair, the embodiments of an  
9 ancient 'other' (Dwyer 2011, p. 51). They represent a synchronic cross-section  
10 of the final moments of people who succumbed to the pyroclastic surges, and  
11 were then immured in the ashes of Vesuvius towards the end of C.E. 79. A  
12 sequence of six distinct pyroclastic surges has been identified from the C.E. 79  
13 eruption of Vesuvius. The fourth surge is implicated with most of the fatalities in  
14 Pompeii (Mastrolorenzo *et al* 2010, p. 4).  
15  
16  
17

18 The victims of this eruption died instantaneously, in "mid action", due to thermal  
19 shock (Petrone *et al* 2014). Nevertheless, traces of them persist, residual  
20 memories recalling their "life-like" poses captured at the second when the torque  
21 of life was replaced by the torque of death due to cadaveric spasm - "a rare but  
22 diagnostic form of instantaneous muscular stiffening associated with instant  
23 violent death" (Mastrolorenzo *et al* 2010). Excavations at Pompeii since the  
24 eighteenth century have combined to produce a unique and extraordinary  
25 assemblage of victim traces and residues, some immaterial, others not (or, at  
26 least, not yet).  
27  
28  
29

30 In the case of this assemblage of Pompeian victims, at least four threads of  
31 residual memory stubbornly persist. Each imprint of the corpses buried by the  
32 fine ash does not only encapsulate fine morphological details, recalling the  
33 victim's features, clothes, hair-style, musculature, and pose (for a detailed  
34 discussion of their forms see Dwyer 2005, 2010, 2011). Inside the identical  
35 geometrical envelope is a residual absence, presenced by a void. Residues of the  
36 victim's skeleton can also be present, perhaps even articulated (Lazer 2009), the  
37 voids thus creating a unique ossuary. In addition, some victims were wearing, or  
38 carrying, possessions, such as bracelets, when they perished. These and other  
39 artifacts have been recovered *in situ*.  
40  
41  
42

43 However, it is the voids that remain the most enigmatic element in the  
44 assemblage. What are these hollow, human-shaped forms? Contradictory and  
45 anomalous theoretical possibilities abound and some may co-exist. Examples  
46 include mimetic casts (see Feldman 2006), khoratic receptacles (see Domanska  
47 2005), interobjective indexical signs of a hyperobject (see Morton 2013),  
48 hauntological im/possibilities (see Barad 2010), and residual memories (Lucas  
49 2012). Their status has profound ethical implications to their subsequent  
50 treatment (see also Feldman 2006, Ouzman 2006, Lazer 2009, pp. 269-70). I  
51 will return to some of these possibilities later.  
52  
53  
54

55 Ontologically ambiguous, conceptually neither structure, artifact, ecofact, nor  
56 deposit, and sitting on the cusp of being either, (or neither), positive or negative  
57 stratigraphic features, they are, nonetheless, sealed contexts. Stratigraphically,  
58  
59  
60

Revised Manuscript

1  
2  
3 this (*im*)*material*<sup>4</sup> assemblage is also simultaneously earlier, co-terminus and  
4 later than the volcanic spew. These residues and traces are, in fact, palimpsests  
5 encapsulating “the dual process of inscription and erasure” (Lucas 2012, p. 115),  
6 demanding ontological inspection. How autonomous are they? Are these voids  
7 actually the final resting places of the victims of Pompeii? Eugene Dwyer is by no  
8 means alone in sensing the eschatological ellipsis implied in the title of his book:  
9 *Pompeii's Living Statues: Ancient Roman Lives Stolen from Death* (Dwyer 2010).  
10  
11

## 12 Suspended Moments in New Contexts

13  
14 The first archaeological encounter with the negative forms found at Pompeii  
15 occurred in 1772 in the Villa of Diomedes, during which only the ash imprints of  
16 parts of a woman's body were salvaged (Lazer 2009, p. 247). It was not until  
17 the mid-nineteenth century that the first successful experiments to capture the  
18 shapes of the voids using plaster of Paris produced some positive forms of  
19 furniture and a door. The first casts presenting the visages of human victims of  
20 the cataclysm were made in 1863 (*ibid.*) and were an immediate sensation. The  
21 imprints and voids in the ash, however, began to withdraw, almost unobserved,  
22 into the background.  
23  
24

25  
26 What becomes of the original, anthropomorphic cavities when archaeologists --  
27 such as Guiseppe Fiorelli in the 1860s, or Amedeo Chicchitti in the 1980s--  
28 puncture their ancient, hardened volcanic shells only to interrupt the ‘act of  
29 discovery’ (see Edgeworth 2003) by injecting them with modern liquid plaster, or  
30 waxes and resins, to beget uncanny fetish-like pseudomorphs? Clearly, the  
31 archaeological encounter excavators experience from now on will be radically  
32 altered, requiring virtually a gestalt shift in their perception, due to this most  
33 invasive post-depositional process, this “transgression” (Shanks 1992, p. 69) to  
34 the sealed context of the victim.  
35  
36

37  
38 Soon after their production, the earliest casts -the quality of which tended to be  
39 somewhat hit-and-miss- were removed from their places of discovery to protect  
40 them from the elements. They were first installed in a rather grim-sounding  
41 building known as the ‘House of the Cadavers of Gesso’. In 1875, however, they  
42 were removed to a new, and better illuminated, museum and exhibited in  
43 vitrines. With this change of context the meaning of assemblage could also be  
44 recast. Now the assemblage was transformed into a curatorial project aimed at  
45 producing performable events, namely exhibitions. By this time, the casting  
46 process has largely been perfected and the collection had grown (Dwyer 2010).  
47  
48

49  
50 By the 1880s individual casts had become favourites with commercial engravers  
51 and photographers, establishing yet another biographical thread witnessing  
52 another event, another transformation; the victims’ rematerialized into albums,  
53 post cards and other publications. Previously artifacts of scientific documentation  
54 in the 1860s (although they show evidence of restitution), the casts of the 1870s  
55 and 1880s were retouched in an apparently stylised manner to reflect  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 contemporary aesthetics and thereby effect "a new canon of showpieces: the  
4 archaeological artefacts as works of art" (Dwyer 2005).  
5

6  
7 However, by the time of a crammed exhibition in 1889 the floruit of the  
8 individual, celebrated cast had waxed and waned at Pompeii itself where the  
9 importance of showing groups of casts in the context of their find spot asserted  
10 itself (Lazer 2009, pp. 257-258). According to Dwyer (2005), after the on-site  
11 museum had been filled to capacity in the 1890s, "it again became necessary to  
12 re-evaluate the nature of the casts, and they once again became archaeological  
13 artefacts". Internationally, however, their iconic status continued to expand.  
14 This celebrity was underscored when Fiorelli gifted a collection of half-scale  
15 terracotta reproductions (*'reductions'*) of the earliest successfully executed casts  
16 to the German Kaiser Wilhelm II in 1888. This collection was given a permanent  
17 exhibition in Berlin's Altesmuseum (Dwyer 2005), but it is now "lost" (Dwyer  
18 2011, p. 54).  
19  
20  
21

22 In 1984, voids and residues representing some 55 victims were encountered at  
23 Oplontis, near Pompeii. One cavity was selected to trial a variation of the lost-  
24 wax casting technique. Molten wax was poured into the chosen cavity and  
25 allowed to set. The wax form uncovered was then encased in a plaster matrix,  
26 after which the wax was replaced by epoxy resin. Ten years later this unique,  
27 transparent, epoxy pseudomorph, encapsulating both skeletal remains and  
28 artifacts, formed part of an exhibition that travelled to Australia. In Sydney,  
29 Estelle Lazer was permitted to investigate this assemblage of the so-called *Lady*  
30 *from Oplontis* using conventional x-ray and CT scanning technology (see Lazer  
31 2009, pp. 260-264).  
32  
33  
34

35 New materials and technologies continue to be entangled with the traces and  
36 residues of the victims of Vesuvius. For example, in 1991, Allan McCollum  
37 exhibited an installation entitled *The Dog from Pompeii August 24, 79 A.D.* in  
38 which several dozen recasts of the second-generation plaster cast known as the  
39 *Dog in Chains* were executed in reinforced fibre glass (see McCollum n.d.). A  
40 decade on, another American artist, Gary Staab, was commissioned to make  
41 models of four original casts for the 2011 *Vesuvius Strikes Again* exhibition held  
42 in New York. According to Jared Lobell, Staab's commission created a new type  
43 of evidence, as his work recorded "the context in which the original casts were  
44 fashioned" (Lobell 2011). Photogrammetry was employed to produce a  
45 computer-generated 3D model, which was, in turn, fed into a computer-  
46 controlled milling process which captured the overall geometry -but not the  
47 subtle details of the surface morphology- of the original casts in their setting by  
48 cutting into a block of a high density foam. Each foam model was then coated in  
49 a thin layer of plaster and the missing fine details were sculpted in. The final  
50 pieces were saturated in industrial strength epoxy resin for durability and  
51 painted before shipping to the exhibition.  
52  
53  
54  
55  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 To this day casts representing the victims of Vesuvius continue to figure  
4 prominently in exhibitions (e.g. Fig 1.) and draw huge audiences in the great  
5 museums and galleries of the world (e.g. Roberts 2013). Casts of the victims of  
6 Vesuvius remain highly sought after within the global memory market.  
7 However, the originals are fragile. To satisfy this ongoing demand, newer, more  
8 sophisticated technologies are being introduced into this extending assemblage.  
9 For example, in 2015, the Special Superintendence for Cultural Heritage of  
10 Pompeii, Ercolano and Scabia is working with an Italian company called WASP to  
11 manufacture full-sized and scaled 3D prints of a number of the original casts, as  
12 shown in Figure 2 for example (Nath 2015).  
13  
14  
15

### 16 Polyvalent Assemblages and Relational Contexts

17 Gavin Lucas, building on Laurent Olivier (2004), argues that imprints, such as  
18 the 3.6 Million year old footprints of hominids encountered at Laetoli in Tanzania,  
19 are not simply 'signs of' an event, they are residual physical memories, the  
20 "extended ripples" of an object, assemblage or event along a "continuum on  
21 which the past is stretched into the present" and out into the future (Lucas  
22 2012, p. 208). Timothy Morton describes this link between fossil prints and the  
23 modern viewer as "some shared sensual space"; a sensuous connection that is  
24 mediated "interobjectively" between the reality of the hominid, the prints, the  
25 rock and ourselves despite their vastly differing timescales (Morton 2013, 86).  
26 For Lucas, the fundamental property that helps preserve these residual  
27 memories across different assemblages is that of "irreversibility", that is changes  
28 to materials which cannot be easily reversed. Put more prosaically, somethings  
29 last longer than others. Lucas uses the example of combining clay, water and  
30 fire to produce ceramics. In so doing an "irreversible change, has occurred  
31 which, even after breakage retains traces of this materialization" (ibid, p. 213).  
32 Equally, important for preserving these residual physical memories is the  
33 absence of dematerializing forces which would otherwise threaten the integrity  
34 of the assemblage (ibid, p. 214).  
35  
36  
37  
38  
39  
40

41 However, lying buried for so long undisturbed, and relatively stable in their  
42 volcanic cocoon, we should recognise that the traces and residues that survive  
43 into the present do not subsist in the immediacy of a teleological process. They  
44 are not the ultimate, or final, traces or residues. The 'archaeological record' is  
45 what the philosopher Alfred Whitehead referred to as "an incompleteness in the  
46 process of production" (Whitehead 1929, p. 298). The term archaeological  
47 record has many possible meanings, but as Lucas (2012) shows they may  
48 usefully be condensed down to just three: the first connotation is that of  
49 material culture, materiality or artifacts understood in their broadest sense; the  
50 next meaning is expressed in terms of how deposits and assemblages come to  
51 be, something he labels as "formation theory"; finally there is the archaeological  
52 record as constructed in the present, also known as the archive. Lucas contends  
53 that all three aspects of the archaeological record need to be considered as an  
54 imbricated whole, because viewing any one facet in isolation can lead to  
55  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 fundamental disconnects or an "interpretive dilemma, in which explanations  
4 often hover between vacuity and incommensurability" (ibid, p. 169).

5  
6 Lucas seeks an alternative to this fragmentation of approaches by offering a new  
7 agenda of mutually constituting archaeological 'interventions' and 'entities'. In  
8 this account, the practices of the field archaeologist are not so much data  
9 collection but interventions, or material interactions, in which tools and  
10 procedures are mobilized locally to materialize new entities or artifacts (e.g.  
11 drawings, samples, photographs, context sheets, field diaries, finds); it is these  
12 new, mobile, dynamic assemblages of autonomous objects that become  
13 archives. Lucas builds on Manuel DeLanda's assemblage theory, (which draws  
14 on the philosophy of Giles Deleuze and Felix Guattari), to rethink and deepen the  
15 concept of the 'archaeological assemblage', whilst still successfully encapsulating  
16 the interplay of its two traditional affinities of deposition and typology. In this  
17 reworking, assemblages are articulated in terms of external relationships, such  
18 as their relations to their environment and other assemblages, as opposed to the  
19 internal configurations of their component parts, which are recognised as having  
20 a certain amount of autonomy, insofar as they can move between assemblages  
21 and recombine elsewhere in other spatiotemporal contexts. Indeed, "[a]lmost  
22 all, if not all, objects are strictly speaking residues of prior assemblages" (ibid, p.  
23 204).

24  
25 Central to Lucas's account of how an archaeological site is translated into an  
26 archive as the result of archaeological interventions are processes of  
27 materialization and dematerialization, "in which objects and people are made  
28 and unmade, in which they have no stable essences but are contextually and  
29 historically contingent (ibid, p. 166). Materialization, or inscription, is  
30 characterized as a stabilizing force of assembly, one that pulls things together  
31 and organizes them. Here, depositional processes (called "containment" or  
32 "territorialization") cohere to assemble, or gather, things in specific places.  
33 Complimentary processes (called "enchainment" or "coding") cohere to generate  
34 recurring associations such as typological similarities or repeated find  
35 combinations. The symmetrical opposite of materialization, is dematerialization,  
36 a destabilizing, disassembling, or erasing, force characterized by the dual  
37 processes of "exposure" (or "deterritorialization") and "dispersal". This entropic  
38 force pulls apart, separates, and displaces materials and artifacts from their  
39 original setting. These two forces are always in tension, one side fostering  
40 aggregation, persistence and continuity, the other producing gaps, absences and  
41 discontinuities. It is this conception of materialization that enables Lucas "to  
42 conjoin what was previously separate: the ontology of things (i.e. materiality)  
43 and their biographies (formation theory)" and to argue that "the material world  
44 is, at any given time, an archive of this process of (de)materialization" (ibid, p.  
45 205).

46  
47 Against this background, Lucas developed a 'flat ontology' in which both objects  
48 or assemblages equally exist within a grid of materializing and dematerializing  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



Revised Manuscript

1  
2  
3 forces “defined by qualities of permeability and persistence” (Lucas 2012, pp.  
4 187-188) and processes of “enchainment and containment” (ibid, pp. 210-214).  
5 Mapping the various instantiations of Pompeian victims onto these powerful  
6 conceptual frameworks, we begin to register the polyvalent character of this  
7 dynamic assemblage. Most importantly, we discern quite clearly how the  
8 meaning and nature of these instantiations changes with context, and how, in  
9 particular, certain interventions, or events, cause parts of the assemblage to  
10 experience rapid changes in their ontic status. I will explore the assemblage first  
11 through the framework of Lucas’s grid of forces defining the qualities of objects.  
12 I will then consider his grid of forces defining the processes of assembly and  
13 disassembly.  
14  
15  
16

17 Lucas frames his first grid of forces as follows: “One might think of [objects] as  
18 ideal points on a grid defined by the qualities of permeability and persistence –  
19 that is, how impermeable they are to material reconfiguration on the one hand,  
20 and how enduring they are on the other” (ibid, p. 187). I characterize the four  
21 forces operating in his un-calibrated, nonlinear, model as *fleeting*, *unfolding*,  
22 *enduring*, and *seeping* (Fig.3). This classification is relational. Fleeting and  
23 unfolding residues are characterised by their transient existence before they  
24 disappear from the record. Differentiated by their relative impermeableness their  
25 separation is merely one of degree. Lucas positions exemplary objects within  
26 each force in his grid. “Vegetable stew”, for instance, can be regarded as a quite  
27 permeable material, with a short use-life, compared to a “leather shoe”, which  
28 tends to last longer and is more impermeable. By contrast both enduring and  
29 seeping traces and residues persist for considerably longer spans, perhaps  
30 millennia. A “pottery vessel”, for example, is very impermeable and will endure  
31 for ages, albeit in the form of stubbornly persistent sherds. Likewise, a “church”  
32 may stand for centuries, but parts seep out of the building as it is worn or  
33 damaged and seep in when repairs and alterations are made. In other words,  
34 the building remains a stable residue through a sedimentation process in which  
35 substitutions to its material matrix are enfolded within its persistent  
36 conformation.  
37  
38  
39  
40  
41  
42

43 How does the extended assemblage emerging from the traces and residues of  
44 victims of the fourth surge fit into this analytical framework? Figure 3 is one  
45 possible mapping. At the outset, I should stress that placing the various traces  
46 and residues of these victims within this framework as coordinates gives a  
47 misleadingly static impression. The arrows try to indicate trajectories to unsettle  
48 such a line of interpretation, since any notion of fixity here is misplaced as  
49 numerous ontological possibilities can be associated with this assemblage. As  
50 Yvonne Marshall and Ben Alberti (2014, p. 34) write “Neither an object nor an  
51 assemblage is ever a fixed, singular entity. Each instantiation is unique, special  
52 and particular”, although we must also recognise that the degree of  
53 differentiation can be slight as well as substantial.  
54  
55  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 In life the victims of Vesuvius had relatively permeable bodies and could have  
4 expected the bracketed life-spans typically accorded to mortals. They could also  
5 rove about the town and its hinterland, and beyond, fairly unimpeded. Their lives  
6 then were unfolding when they were cut short by the fourth surge. Once dead,  
7 instead of the mortuary rites they could normally have expected, a layer of  
8 volcanic material engulfed the victim's body and hardened to form a long-  
9 lasting, but porous, cocoon-like tomb. The decomposing corpses seemingly  
10 seeping into surrounding permeable deposits eventually left both the imprints  
11 and the voids. These stable, symbiotic, (im)material pairings persisted for nearly  
12 two thousand years until archaeologists introduced liquid plaster into their  
13 context.  
14  
15  
16

17  
18 Each instantiation of a victim due to the casting process precipitates a *glitch* in  
19 these residual memories; a glitch which manifests as a brief flicker (at least in  
20 archaeological measures of time) between a disappearing and reappearing  
21 absent-presence. The first glitch occurs when the previously ethereal, but stable,  
22 black, ghost-like, and 'naturally' produced absent-presence, contained within its  
23 volcanic tomb is violated by this physical alterity. The void 'disappears' as the  
24 liquid plaster is injected. A chain of events is triggered by the instantiation (or  
25 (re)materialization) of the victim as an opaque, white *figure*, which is also, in  
26 fact, a modern *pseudomorph*, literally a false body. Pseudomorphs are produced  
27 *in situ* through a process of substitution in which the body's shape remains  
28 constant but the properties of the replacement material are completely different  
29 from the original. In this context, however, they are most commonly referred to  
30 as 'casts'. In many instances, however, surviving skeletal remains were also  
31 incorporated into the fabric of the cast, in which case the newly created object  
32 can also be considered as both a *reliquary* and a *fetish*.  
33  
34  
35  
36

37  
38 Second-generation casts were formed using moulds taken from a pseudomorph-  
39 cum-reliquary. Echoes of the act of discovery resonate within the moulds'  
40 negative spaces as each successive casting produces another flicker, another  
41 glitch. At one more step removed, no trace of the victim's skeleton could be  
42 transferred into these latest derivatives which now become *effigies*. Additionally,  
43 as these effigies are re-produced in new and different materials, with material  
44 affordances far removed from their ultimately organic prototypes, they are also  
45 technically *skeuomorphs*, that is the form of the object is made in another  
46 material or by other techniques.  
47  
48

49  
50 Although they will not be pursued here, significant questions also burnish the  
51 auratic qualities of these enduring enigmatic objects, in other words those  
52 qualities that make us feel connected to the past emotionally as well as  
53 intellectually. It is impossible to ignore the ineffable aura that still makes some  
54 of these casts so iconic. This aura, it should be noted, seems to migrate into the  
55 subsequent second- and later-generation rematerializations, known as 'replica  
56 casts', who feature in many museum exhibits around the globe (e.g. Fig 2)<sup>5</sup>.  
57 Many people display a strong visceral reaction when confronted with these casts  
58  
59  
60

Revised Manuscript

1  
2  
3 (e.g. Lazer 2009, p. 251, Dwyer 2011, pp. 51-54). For instance, the writer and  
4 statesman Luigi Settembrini recounts his awe and emotion provoked on seeing  
5 the casts in a letter, published in the *Giornale di Napoli* on 17<sup>th</sup> February 1863:  
6 "but you, oh my Fiorelli, have uncovered human suffering and whoever has an  
7 ounce of humanity will feel it" (cited in Roberts 2013, p. 297).  
8  
9

### 10 Some Ontological Considerations

11 What is the ontological status of these casts, considered by some to be  
12 "paradigmatic in the documentation of perishable remains" (see Dwyer 2011, p.  
13 56) permitting further forensic examination? Are they casts of the interior  
14 surfaces of the enclosure or casts of the voids? Are archaeologists simply taking  
15 a cast of the form of the victim created after the ash engulfed the body or is this  
16 propinquity more complex? Is the memory invoked by the absence more present  
17 than we might ordinarily assume? Eva Domanska, in her fertile archae-  
18 ontological analysis of the Argentinian *desaparcido*, situates the absent bodies of  
19 the disappeared in the conceptual space of a "non-absent past", characterized as  
20 being "the ambivalent and liminal space of 'the uncanny'", an "awesome 'empty  
21 grave'" occupied by "ghostly artifacts". This empty grave "not only occupies a  
22 particular place, but itself is a place and forms a place", a form of receptacle, or  
23 *khôra*, "an active dynamic place endowed with potentiality", perhaps a "place  
24 where death finds shelter" (Domanska 2005, pp. 405-406). This prompts a  
25 question in the context of the Pompeian traces: as the voids are filled by  
26 material, is the absence suffused by the injected substance, or, in this rather  
27 fleeting moment, is that absence infused into the solidifying cast to become  
28 something more physical and enduring? In other words, are these immaterial  
29 contexts obliterated by the injected substances used to obtain the casts or is the  
30 immaterial instantiation still co-present in the cast? Later, when the cast is  
31 exhumed, is the void 'restored', is some aspect of the missing person, or the lost  
32 body, repatriated, and is the context reinstated?  
33  
34  
35  
36  
37  
38

39 Another chain of events can also be implicated in the negative spaces. If the  
40 casts had never been made, and the volcanic cocoon and the imprint simply  
41 picked and shovelled away, would the absence still be there occupying the same,  
42 original, space, but now unbounded, undetectable and unappropriated? Would it  
43 escape or dissipate when its cocoon was breached? I would argue that the  
44 spaces in which the Pompeian victims of the fourth pyroclastic surge both lived  
45 and died endure. As the plaster dries, the pseudomorph shrinks away from the  
46 imprint. The absence resurges, at least for a little while, in the space which  
47 reappears as the boundaries demarcating the domains of *exterior* and *interior*  
48 are reconfigured. If so, yet another paradox raises its ironic head. 'Excavation'  
49 in the context of these enclosures-cum-voids is non-invasive, at least until 'the dig'  
50 ends. Does this mean that when these trenches are backfilled that the 'original'  
51 contexts, assemblages and palimpsests –these ghost-like residual memories—  
52 are finally erased, and inscribed anew?  
53  
54  
55  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 Lucas's second tool for analysing assemblages is called the "grid of forces of  
4 assembly and disassembly". Within this framework he puts the focus of attention  
5 firmly on the tension between the processes of "(re)materialization" and  
6 "dematerialization" (Lucas 2012, p. 213, Figure 16). Not all the action, however,  
7 is wrapped up in this materialization versus dematerialization contest. Two other  
8 active forces operate in the complimentary spaces of this framework, although  
9 Lucas doesn't expand on them (refer to Fig. 4). These forces, I call *colonization*  
10 and *dissipation*, also have vital roles to play within assemblages, principally in  
11 reconfiguring or extending them. The contours of colonization are shaped by the  
12 dual processes of enchainment/coding and exposure/deterritorialization, the  
13 effect of which is to maintain the material coherence of the assemblage while it  
14 is displaced, perhaps far away, in time and space from its original setting.  
15 Colonization thus radically reconfigures the topology and boundaries of an  
16 assemblage. By contrast, the force of dissipation, harnesses the twin processes  
17 of containment and dispersal to cause elements of an assemblage to break-up  
18 and disintegrate in the neighbourhood of their original setting.

19  
20  
21  
22  
23  
24 Returning to the victims of the fourth surge, we can observe some new aspects  
25 of the polyvalent character of this extending assemblage. Immurement ensured  
26 that the victims' bodies would remain contained at Pompeii for some  
27 considerable time; time enough for *dissipation* to loosen the corpses from the  
28 embrace of their enchained imprints. Once the victims were discovered,  
29 however, the dual forces of dematerialization and (re)materialization were  
30 actuated simultaneously. The one dismembering the volcanic cocoons as the  
31 remains were removed to either spoil heaps or excavation archives, the other  
32 precipitating the casts, which were soon beset by the forces of dispersal. The  
33 casts started degrading immediately through shrinkage as the plaster dried, by  
34 imperfections, such as bubbles and the plugs marking the entrance and egress  
35 apertures when the liquid plaster was introduced, and later by the armature of  
36 the moulds made to produce the subsequent 'replicas'. These latter are, of  
37 course, themselves casts with the same characteristics and limitations (Lazer  
38 2009, p. 254) which in turn amplify the effects of these forces.

39  
40  
41  
42  
43 Despite this, the trajectory of materialization is sustained by the growing  
44 number of reiterations of the victims' bodies which emphasize the enchainment  
45 process by repeated citation of their prototypes. However, while some of the  
46 pseudomorphs remained relatively contained at Pompeii, (some still *in situ*),  
47 others became peripatetic. Indeed, many skeuomorphs became much more  
48 mobile, and mutable, when exposed to the rigours of travel and handling. The  
49 gift of the *reductions* to Kaiser Wilhelm in 1888 is the event that probably marks  
50 the genesis of the diaspora of iconic casts --each individual establishing its own,  
51 but entwined, biographical thread-- spreading around the world and *colonizing*  
52 new assemblages over the following centuries. The potential for a step-order  
53 change in colonization occurred in 1994, in Australia, when Lazer and her  
54 ensemble of CT scanning technology became entangled with the *Lady of Oplontis*  
55  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 assemblage. Beside the forensic analysis she produced, what also emerged from  
4 this encounter was the first *digital skeuomorph* of a Pompeian victim.

### 6 Virtual Skeuomorphs in New Digital Palimpsests

7  
8 What does the curator now have to preserve, reconstitute, conserve, display, copy  
9 or loan? I would argue that the CT scans have recast the victims' traces and  
10 residues in a digital recursion which engenders new forms of digital discovery  
11 (see Edgeworth 2014), giving them an extended afterlife, generative of multiple  
12 new becomings. These virtual casts bring us full circle to the porous cavities, as  
13 such digital objects can be very permeable whilst simultaneously immutable.

14  
15  
16 The boundaries of virtual objects can be ambiguous, and here I'm thinking of 3D  
17 printed things and their definition files (see also Beale and Reilly 2015, pp. 123-  
18 125). Tomographic reiteration of the epoxy resin pseudomorph/skeleton enabled  
19 a digital skeuomorph to be instantiated in an encoded form. In this new digital  
20 form, it became what Bruno Latour calls an 'immutable mobile' (Latour 1987) in  
21 that it has some permanence and yet is easily transportable. Digital formats  
22 affords further reiterations of the assemblage as physical 3D printed objects (see  
23 Nath 2015 for examples of 3D printed "Pompeii Casts"), a new form of  
24 propinquity. Paradoxically, although the additive manufacturing digital code  
25 defining the physical things to be 3D printed is extremely stable, in the sense it  
26 doesn't decay, the digital objects thus defined are actually very permeable and  
27 extensible. Whereas the limits of the physical objects may be clearly defined  
28 surfaces, the boundaries of the digital object are drawn by the same file format  
29 in which they are defined, that is the same digital code that marks the content  
30 *and* the voids. Digital artifacts and assemblages besides being porous are easily  
31 networked, replicated, aggregated, augmented, resampled, processed or  
32 transcoded into other formats (Berry 2014), and thereby extended. They are  
33 also susceptible to new kinds of exploration and analysis. Indeed they can be  
34 recontextualized, re-iterated, (re)materialized, reconceptualised, re(con)figured,  
35 and (re)discovered.

36  
37  
38 But what can be instantiated from the digital 'record': virtual or physical traces  
39 and residues? The answer is both and, as Victor Buchli (2010, pp. 281-282)  
40 highlights, conventional understandings of materiality are now problematized  
41 since "the digital representation and the physical thing are difficult to  
42 meaningfully differentiate". However, although material residues "remain and  
43 last as long as the material of which they are made of lasts" (Olivier 2004, p.  
44 206), these physical objects are subject to decay, damage and mishandling.  
45 Ultimately, and perhaps ironically, it is the "immaterial digital code" (Buchli  
46 2010, pp. 281-283), and the scans, that emerge as the most stable traces  
47 between and betwixt virtual and physical worlds.

48  
49  
50 David Berry, however, rejects the immateriality of code and draws attention to  
51 the "concrete thing-in-this-world-ness of software" (Berry 2011, p. 5). In digital  
52 form, both data and code, are buried within a new electronic palimpsest under  
53  
54  
55  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 layers of code (e.g. source, executable, machine, operating system),  
4 characterised by Jeremy Huggett (2004, p. 84) as "layers of opacity", and  
5 distributed across networks and storage devices in which they are ultimately  
6 inscribed on an inorganic substrate. This technology stack also has a life cycle:  
7 code ages and dies; machines break down and become defunct (Berry 2011, pp.  
8 42-51). From this position, both software and data migration, perhaps also some  
9 hardware emulation, will likely be required to keep breathing life into these  
10 digital objects (for a deeper discussion of the issues of digital preservation see  
11 Baker & Anderson 2012, Chue Hong 2012, Mathews *et al* 2012). Nevertheless,  
12 the key point is that both the scans and the code are what Bernard Stiegler  
13 characterises as 'orthothetic' in nature (Stiegler n.d.). Orthothetic here denotes  
14 an 'exact' form of recording using digital technologies, such as digital cameras,  
15 scanners, storage and networks, to permit the exact registration, inscription,  
16 and repetition of some object or event. Put another way, digital recording  
17 technology can capture, and put into digital stasis, the exact spatial poses of  
18 objects, assemblages or spaces –from one unique fleeting moment of time– and  
19 make them available, stabilized exactly as sampled, for all time, when combined  
20 with a permanent internet location (e.g. Digital Object Identifier (DOI)), in  
21 principle, to any agent/actant/compactant<sup>6</sup> with access to an internet device.  
22  
23  
24  
25  
26

27  
28 So while all beings in a flat ontology equally exist, not all the beings are equal  
29 and their trajectories are becoming unpredictable. Whereas in the 'old' physical  
30 world the processes of materialization and dematerialization were paramount, in  
31 the digital universe born-digital instantiations enable more promiscuous  
32 translations, and substitutions, to start *colonizing* adjacent, previously  
33 untrammelled spaces in Lucas's flat ontology. At the same times, formerly  
34 irreversible changes are now becoming unstable and indeed reversible as the  
35 virtual and material worlds begin to seep, or bleed, into one another.  
36  
37

38  
39 The concept of territorialization in particular is being challenged in the digital  
40 archaeological record. This in and of itself is no bad thing but it does raise some  
41 new, and amplifies many old, issues. For example, if we regard these myriad  
42 instantiations to be in some sense human remains, then clearly there are many  
43 ethical issues around the display, ownership, handling, treatment and acceptable  
44 use that need to be addressed (e.g. Brooks and Rumsey 2007, Alberti *et al*  
45 2009). Of course, many of these ethical issues can be side-stepped by  
46 objectifying the casts, replica casts and reductions and transforming them into  
47 *artifacts* within the global memory market (see Ouzman 2006 for a broader  
48 discussion of 'lost bodies'). For example, Eugene Dwyer (2005) shows, very  
49 clearly, how the body disappears through an objectification discourse when he  
50 asks: "What precisely are the casts –are they archaeological artefacts, or are  
51 they works of art?" The answer it seems is either one, both, many, more, and  
52 less: voids-cum-imprints; voids-cum-ossuaries; pseudomorphs-cum-reliquaries;  
53 pseudomorphs-cum-fetishes; skeuomorphs-cum-effigies; bodies-cum-works-of-  
54 art; casts-cum-artifacts; casts-cum-ecofact; (im)material-digital-casts-cum-  
55 prototypes; 3D printed artifacts.  
56  
57  
58  
59  
60

Revised Manuscript

## Conclusion

Objects and assemblages gather histories around themselves; they develop cultural biographies as they accumulate new significance, connections and meaning throughout their existence (Gosden and Marshall 1999). Their meaning and significance, however, is contingent on the web of relations and intra-actions in which these entities get caught up in. Meanings, therefore, can be renegotiated, even radically reset. In other words they are always in progress. As Chris Fowler (2013) shows using the case study of the Kyløe Necklace, the actions, technologies, ideas and practices we apply in the present extend objects and assemblage in different directions. As the extending, genealogical, assemblage of Pompeian victims of the fourth surge continues to branch out its topology is re(con)figured and multiple new biographical threads of meaning and significance are actuated.

The extending assemblage of the Pompeian victims of the fourth pyroclastic surge of Vesuvius in C.E. 79 is just one example of a previously (im)material set of entities that is radically destabilising contemporary understandings of concepts such as real, virtual, original and authentic.

The eruptions of Vesuvius were not confined to early Roman Imperial Pompeii. The footprints of humans in much earlier Vesuvian ashes, apparently evacuating the area in the Early Bronze Age testify to this (see Petrone et al 2014). Vesuvius, of course, is not a lonely active volcano. The Minoan Bronze Age town of Akrotiri, on the Aegean island of Santorini (Thera), was also engulfed by volcanic activity. Here too archaeologists employ the technique of casting voids to capture the forms of amongst other things window frames, furniture and fishing nets (e.g. Trantalidou 2008, p. 55).

Other examples of significant spaces within material objects are ceramic rattles (e.g. Braun 2002, pp. 100-107, Taxel et al 2013) and bullae (Marko 2014). Both categories of objects can be characterized as having other objects hidden, sometimes deliberately stashed, or sealed, within their physical bodies. Intact bullae are extremely rare, and accessing the interior of such objects is only conceivable using non-invasive techniques (Marko 2014). Here again CT scanning and 3D printing enable detailed visual and tactile examination, and previously impossible interventions, such as breaking open the 'new' bulla to investigate its hidden contents, with minimal handling of the original specimen.

Voids have been shown to be ontologically polyvalent, unstable and subject to repeated transformation due to their contingent and inherently mutable nature. Paradoxically, such instability is simultaneously amplified and arrested in the digital, particularly through the media of additive manufacturing technology, which have the potential to preserve or totally transform future intra-actions with such (im)material assemblages, when they are further reiterated, extended, re(con)figured, and deterritorialized, as they are distributed through time and space as 3D printable digital objects.

Revised Manuscript

1  
2  
3 As evolving technologies continue to blur the ontological boundaries between  
4 real and virtual (see Rogers 2009, Carusi 2011, Hoel and van der Tuin 2013),  
5 and where "phenomena are the ontological entanglement of object and the  
6 agencies of observation" (Barad 2007, p. 309), categorisations such as *copies*,  
7 *clones*, *facsimiles*, *imitations*, *replicas* and reproductions no longer sit  
8 comfortably with these objects. Infinitions burst free of such procrustean  
9 registers to be (re)printed, endlessly, in different materials, at different scales,  
10 with enhanced morphological features, with different (im)material properties, in  
11 multiple spatio-temporal locales, to intra-face to, and intra-act with, uncoun-  
12 ted new actants.  
13  
14  
15

16 Currently, digital (im)material entities are emerging as newly deterritorialized  
17 and *yet-to-be-materialized* places, or spaces, of discovery, where the  
18 archaeological assemblage can be condensed into a new prototypical vehicles of  
19 archaeological registration, research, conservation and presentation. In common  
20 with other prototypes, these entities can enfold within them various biographical,  
21 techno-scientific and cultural significances as they open up a world of  
22 compossibility, facilitating "a proliferation of abductions and transformations"  
23 (Corsin 2014, p. 385) including 3D printed possibilities whose materiality is  
24 rendered propinquitous (ibid, p. 382), creating yet more deeply stratified  
25 palimpsests of (im)material assemblages in new digital contexts offering fresh  
26 possibilities for further digital acts of discovery and new conceptions of  
27 residuality.  
28  
29  
30  
31

### 32 Acknowledgements

33 Figure 1 is reproduced by kind permission of Catriona Cooper. Figure 2 is  
34 reproduced by kind permission of WASP. Thanks is also due to Andrew M. Jones,  
35 Jude Jones, Yvonne Marshall, Louisa Minkin, and the anonymous reviewers for  
36 their helpful comments on an earlier draft of this paper. Residual and  
37 subsequent deficiencies remain my own.  
38  
39  
40  
41

### 42 Notes

- 43  
44 1. I apply the term *residue* to refer to enduring and on-going material or  
45 physical remains. I use *trace* in the sense of a persistent mark, or effect,  
46 an indication of the existence, or former existence, of something. Traces  
47 may be inscribed on a material, but they may also be immaterial.  
48 Manifestations include absences, gaps, and discontinuities. Stratigraphic  
49 interfaces, such as cuts, and the boundaries between overlapping layers  
50 are classic examples. In the excavation section drawing, the interface  
51 between layers are traced and re-presented in graphite (whilst, somewhat  
52 ironically, the contiguous layers still present are often depicted as blank).  
53  
54 2. Rather than using the terms "actor" and "interactions" I have adopted the  
55 neologisms of 'actant' (after Latour 1987) and 'intra-action' (after Barad  
56 2007). Here an actant is any entity (archaeologist, material, object,  
57  
58  
59  
60



Revised Manuscript

1  
2  
3 apparatus, technique, theoretical assumption, method, or force) capable  
4 of affecting another entity. Intra-action refers to the mutually constituting,  
5 entangled effects of actants connecting, intersecting or otherwise affecting  
6 one another.  
7

- 8 3. Humans were not, of course, the only casualties of this catastrophe.  
9 Animals (e.g. dogs, donkeys and pigs) and plants (e.g. trees), plus other  
10 organic residues, including 'lost' wooden doors, shutters, even loafs of  
11 bread are known to have been recorded at Pompeii using such casting  
12 techniques (Dwyer 2011, pp. 46 & 55). 'The Dog from Pompeii August 24,  
13 79 A.D.' 1991 by artist Allan McCollum is probably the most famous cast  
14 (McCollum n.d.).  
15  
16 4. I use "(im)material" throughout to indicate a pairing or the coexistence of  
17 both physical material elements and non-physical immaterial elements,  
18 most notably to indicate the imprint and void entanglements.  
19  
20 5. Giorgio Agamben (1999), Sven Ouzman (2006), Bruno Latour and Adam  
21 Lowe (2011) and more recently Stuart Jeffrey (2015), invoking widely  
22 divergent examples, argue that aura can indeed be reconstituted anew in  
23 different rematerializations of an *object*, including digital instantiations  
24 (Jeffrey 2015).  
25  
26 6. Compactants, or computational actants, are mediation processes and  
27 interfaces/intrafaces between intra-acting devices, code and data  
28 structures and networks (Berry 2014, pp. 68-69).  
29  
30

### 31 Figure Captions

32 **Figure 1.** Pompeian victim cast of a cast (effigy) at TAG2014 Conference  
33 Reception held at Manchester Museum (Photo Catriona Cooper).  
34

35 **Figure 2.** 3D printed instantiation of a Pompeian victim (Photo reproduced  
36 courtesy of Delta Wasp).  
37

38 **Figure 3.** Mapping the extended Pompeian assemblage due to the fourth  
39 pyroclastic surge to the 'persistency versus permeability' grid of forces  
40 framework (After Lucas 2012, Figure 12, p. 187, quadrant labels added).  
41

42 **Figure 4.** Mapping the extended Pompeian assemblage due to the fourth  
43 pyroclastic surge to the 'enchainment v containment' grid of forces (After Lucas  
44 2012, Figure 16, p. 213, Disintegration and Colonization classification labels  
45 added).  
46  
47  
48

### 49 References

50 Agamben, G. 1999. *The Man with No Content*. Stanford: Stanford University  
51 Press.  
52

53  
54 Alberti, S., Bienkowski, P., Chapman, M. and Drew, R. 2009. Should we display  
55 the dead? *Museum and Society* 7, 133-49  
56  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 Baker, D. and Anderson, D. 2012. Laying a Trail of Breadcrumbs – Preparing the  
4 Path for Preservation. *In: J. Delve, D. Anderson, M. Dobрева, D. Baker, C.*  
5 *Billenness and L. Konstantelos, eds. The Preservation of Complex Objects:*  
6 *Volume 1. Visualisations and Simulations.* Portsmouth: University of Portsmouth,  
7 15-23.  
8

9  
10 Barad, K. 2007;. *Meeting the Universe Halfway: Quantum Physics and the*  
11 *Entanglement of Matter and Meaning.* Durham, NC: Duke University Press.  
12

13 Barad, K. 2010. Quantum Entanglements and the Hauntological Relations of  
14 Inheritance: Dis/ continuities, SpaceTime Enfoldings, and Justice-to-Come.  
15 *Derrida Today*, 3 (2), 240-268.  
16

17 Beale, G. and Reilly, P. 2015. Additive Archaeology: The Spirit of Virtual  
18 Archaeology Reprinted. *In: C. Papadopoulos, E. Paliou, A. Chrysanthi, E. Kotoula and*  
19 *A. Sarris, eds. Archaeological Research in the Digital Age. Proceedings of the 1st*  
20 *Conference on Computer Applications and Quantitative Methods in Archaeology Greek*  
21 *Chapter (CAA-GR) Rethymno, Crete, 6-8 March 2014.* Rethymno: Institute for  
22 Mediterranean Studies – Foundation of Research and Technology (IMS-Forth), 120-128.  
23

24  
25 Berry D.M. 2011. *The Philosophy of Software: code and mediation in the digital*  
26 *age.* Basingstoke: Palgrave Macmillan.  
27

28  
29 Berry D.M. 2014. *Critical Theory and the Digital.* London: Bloomsbury Academic.  
30

31 Braun, J. 2002. Music in Ancient Israel/Palestine: Archaeological, Written, and  
32 Comparative Sources. Cambridge, Wm. B. Eerdmans Publishing  
33

34 Brooks, M.M. and Rumsey, C. 2007. Who knows the fate of his bones?  
35 Rethinking the body on display: object, art or human remains? *In: J. Knell, S.*  
36 *Macleod and S. Watson, eds. Museum Revolutions: How Museums Change and*  
37 *are Changed.* London: Routledge, 334-54.  
38

39  
40 Buchli, V. 2010. The Prototype: presencing the immaterial. *Journal of*  
41 *VisualCommunications* 9, 273-286.  
42

43 Carusi, A. 2011. Trust in the Virtual/Physical Interworld. *In: C. Ess and M.*  
44 *Thorseth, eds. Trust and Virtual Worlds: Contemporary Perspectives.* New York:  
45 Peter Lang, 103-119.  
46

47  
48 Chue Hong, N. 2012. Digital Preservation and Curation: The Danger of  
49 Overlooking Software Preservation. *In: J. Delve, D. Anderson, M. Dobрева, D.*  
50 *Baker, C. Billenness and L. Konstantelos, eds. The Preservation of Complex*  
51 *Objects: Volume 1. Visualisations and Simulations.* Portsmouth: University of  
52 Portsmouth, 25-35.  
53

54  
55 Corsin Jimenez, A. 2014. Introduction. *Journal of Cultural Economy* 7 (4), 381-  
56 398.  
57  
58  
59  
60

Revised Manuscript

1  
2  
3 Domanska, E. 2005. Towards the Archaeontology of the dead body. *Rethinking*  
4 *History: The Journal of Theory and Practice*, 9, 389-413.

5  
6 Dwyer, E. 2005. From Fragments to Icons: Stages in the Making and Exhibiting  
7 of the Casts of Pompeian Victims, 1863-1888. *Interpreting Ceramics* 8.  
8 Available: <http://www.interpretingceramics.com/issue008/articles/06.htm>  
9 [Accessed 18 January 2015].

10  
11 Dwyer, E. 2010. *Pompeii's Living Statues: Ancient Roman Lives Stolen from*  
12 *Death*. Ann Arbor: University of Michigan Press.

13  
14 Dwyer, E. 2011. The first plaster casts of the Pompeian victims. In: P.  
15 Bonaventura and A. Jones, eds. *Sculpture and Archaeology*. Farnham: Ashgate  
16 Publishing, Farnham, 45-60.

17  
18 Edgeworth, M. 2003. *Acts of Discovery: An Ethnography of Archaeological*  
19 *Practice*. BAR International Series 1131. Oxford: Archaeopress.

20  
21 Edgeworth, M. 2014. From Spade-Work to Screen-Work: New Forms of Archaeological  
22 Discovery in Digital Space. In: A. Carusi, A.S. Hoel, T. Webmoor and S. Woolgar,  
23 eds. *Visualization in the Age of Computerization*. Abingdon: Routledge, 40-58.

24  
25 Feldman, J.D. 2006. Contact Points: Museums and the Lost Body Problem. In: E.  
26 Edwards, C. Gosden and R.B. Phillips, eds. *Sensible Objects: Colonialism,*  
27 *Museums and Material Culture*. Oxford: Berg, 245-268.

28  
29 Fowler, C. 2013. Dynamic Assemblages, or the Past is What Endures: Change  
30 and the Duration of Relations. In: B. Alberti, A.M. Jones and J. Pollard, eds.  
31 *Archaeology after Interpretation: Returning Materials to Archaeological Theory*.  
32 Walnut Creek: Left Coast Press.

33  
34 Fowles, S. 2010. People without Things. In: M. Bille, F. Hastrup and T.F.  
35 Sorensen, eds. *An Anthropology of Absence. Materializations of*  
36 *Transcendence and Loss*. New York: Springer, 23-41.

37  
38 Gosden, C. and Marshall, Y. 1999. The cultural biography of objects. *World*  
39 *Archaeology* 31 (2), 169-178.

40  
41 Horada, S. 2014. *The Void. An Archaeological Survey*. Available:  
42 <http://www.kamellazaarfoundation.org/initiatives/4/39>. [Accessed 30 November  
43 2014].

44  
45 Hoel, A.S. and van der Tuin, I. 2013. The Ontological Force of Technicity:  
46 Reading Cassirer and Simondon Diactively. *Philosophy and Technology*, 26  
47 (2), 187-202.

48  
49 Huggett, J. 2004. Archaeology and the New Technological Fetishism. *Archeologia*  
50 *e Calcolatori* 15, 81-92.

Revised Manuscript

1  
2  
3 Ingold, T. 2007. Materials against materiality. *Archaeological Dialogues* 14, 1-  
4 16.

5  
6 Jeffrey, S. 2015. Challenging Heritage Visualisation: Beauty, Aura and  
7 Democratisation. *Open Archaeology* 1 (1), 144-152.

8  
9 Latour, B. 1987, *Science in Action. How to Follow Scientists and Engineers*  
10 *through Society*. Cambridge: Harvard University Press.

11  
12 Latour, B. and Lowe, A. 2011. The migration of aura or how to explore the  
13 original through its facsimiles. In: T. Bartscherer and R. Coover, eds. *Switching*  
14 *Codes. Thinking Through Digital Technology in the Humanities and the Arts*.  
15 Chicago: Chicado University Press, 275-98.

16  
17 Lazer, E. 2009. *Pompeii Resurrected*. London: Routledge.

18  
19 Lobell, J.A. 2011. Pompeii's Dead Reimagined. *Archaeology - Archive*, 64 (5).  
20 Available:  
21 [http://archive.archaeology.org/1109/features/pompeii\\_casts\\_gary\\_staab.html](http://archive.archaeology.org/1109/features/pompeii_casts_gary_staab.html)

22  
23 Lucas, G. 2012. *Understanding the Archaeological Record*. Cambridge: CUP.

24  
25 Marko, A. 2014. *The Modern Ancient Tablet. A curatorial intervention*. Available:  
26 [http://curatorialpracticum.wordpress.com/2014/05/04/the-modern-ancient-](http://curatorialpracticum.wordpress.com/2014/05/04/the-modern-ancient-tablet/)  
27 [tablet/](http://curatorialpracticum.wordpress.com/2014/05/04/the-modern-ancient-tablet/) [Accessed 15<sup>th</sup> July 2015].

28  
29 Marshall. Y. and Alberti, B. 2014. A Matter of Difference: Karen Barad, Ontology  
30 and Archaeological Bodies. *Cambridge Journal of Archaeology* 24 (1), 19-36.

31  
32 Mastrolorenzo, G., Petrone, P., Pappalardo, L., and Guarino, F.M. 2010. Lethal  
33 Thermal Impact at Periphery of Pyroclastic Surges: Evidences at Pompeii. *PLoS*  
34 *ONE* 5 (6), e11127.

35  
36 Mathews, B., Shaon, A. and Conway, E. 2012. How do I know that I have  
37 Preserved Software In: J. Delve, D. Anderson, M. Dobрева, D. Baker, C.  
38 Billenness and L. Konstantelos, eds. *The Preservation of Complex Objects:*  
39 *Volume 1. Visualisations and Simulations*. Portsmouth: University of Portsmouth,  
40 36-53.

41  
42 McCollum, A. n.d. *The Dog from Pompeii August 24, 79 A.D.* Available:  
43 <http://allanmccollum.net/amcnet2/album/pompeidog.html>. [Accessed 21  
44 February 2015].

45  
46 Morton, T. 2013. *Hyperobjects. Philosophy and Ecology after the End of the*  
47 *World*. London/Minneapolis: University of Minnesota Press.

48  
49 Nath, R. 2015. Initiative taken to restore "Pompeii Casts" using 3D printing  
50 technology. *think3D*. Available: [http://www.think3d.in/initiative-taken-to-](http://www.think3d.in/initiative-taken-to-restore-pompeii-casts-using-3d-printing-technology/)  
51 [restore-pompeii-casts-using-3d-printing-technology/](http://www.think3d.in/initiative-taken-to-restore-pompeii-casts-using-3d-printing-technology/)

Revised Manuscript

1  
2  
3 Olivier, L. 2004. The past of the present. Archaeological memory and time.  
4 *Archaeological Dialogues* 10, 204-213.  
5

6 Ouzman, S. 2006. The Beauty of Letting Go: Fragmenting Museums and  
7 Archaeologies of Archive. In: E. Edwards, C. Gosden and R.B. Phillips, eds.  
8 *Sensible Objects: Colonialism, Museums and Material Culture*. Oxford: Berg,  
9 269-301.  
10

11 Petrone, P., Niola, M., di Lorenzo, P., Graziano, V., Paternoster, M. and Buccelli,  
12 C. 2014. A New Forensic Approach to Past Mass Disasters: The Human Victims of  
13 Vesuvius. *Austin Journal of Forensic Science and Criminology* 1 (1), 2.  
14

15 Roberts, P. 2013. *Life and Death in Pompeii and Herculaneum*. London: British  
16 Museum Press.  
17

18 Rogers, R. 2009. *The End of the Virtual: Digital Methods*. Amsterdam:  
19 Vossiuspers.  
20

21 Shanks, M. 1992. *Experiencing Archaeology*. London: Routledge.  
22

23 Stiegler, B. n.d. *Anamnesis and Hypomnesis*. Available:  
24 <http://arsindustrialis.org/anamnesis-and-hypomnesis>. [Accessed 15<sup>th</sup> July 2015].  
25

26 Taxel I., Iserlis, M. and Yannai, E. 2013. The Inside Out of Childhood  
27 Archaeology: Petrographic and X-ray Analysis of early Islamic Ceramic rattles  
28 from Mishmar David (Israel) and their Cultural Implications. *Journal of Eastern*  
29 *Mediterranean Archaeology and Heritage Studies* 3 (1), pp. 219-227.  
30

31 Trantalidou, K. 2008. Archaeozoological Research at the Akrotiri Excavation. *AAΣ*  
32 6, (Periodical Publication of the Society for the Promotion of Studies on  
33 Prehistoric Thera) 26-69.  
34

35 Whitehead, A.N. 1929. *Process and Reality. An Essay on Cosmology*. Cambridge:  
36 CUP.  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



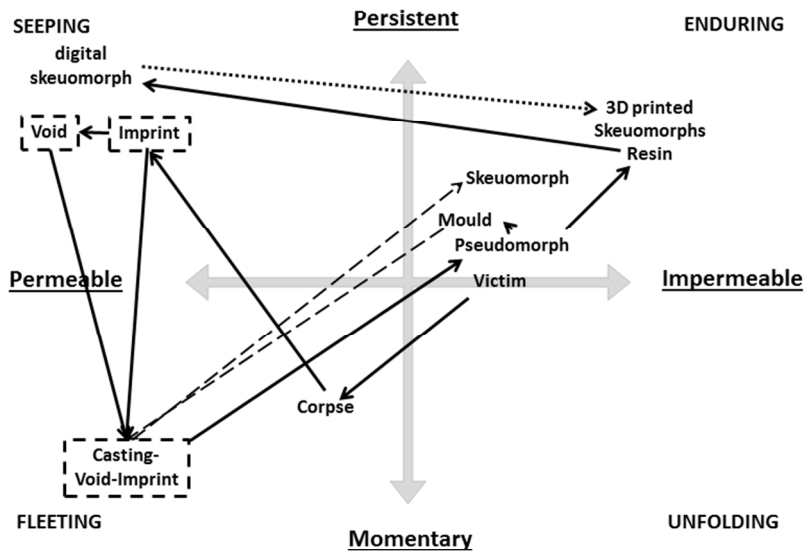
Pompeian victim cast (effigy) at TAG2014 Conference Reception held at Manchester Museum (Photo  
Catriona Cooper)  
254x143mm (96 x 96 DPI)

Review Only



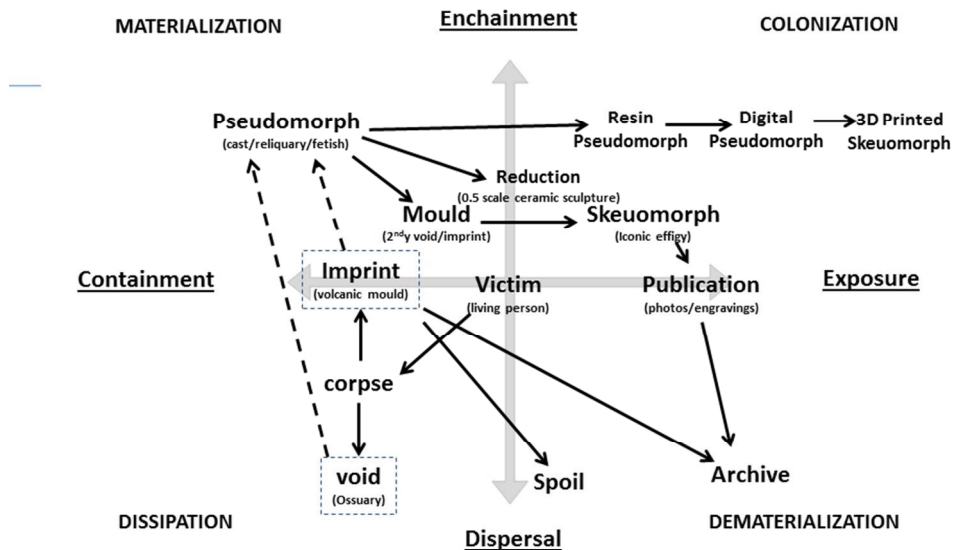
3D printed instantiation of a Pompeian victim (Photo reproduced courtesy of Delta WASP)  
451x270mm (72 x 72 DPI)

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



Mapping the extended Pompeian assemblage due to the fourth pyroclastic surge to the 'persistency versus permeability' grid of forces framework (After Lucas 2012, Figure 12, p. 187, quadrant labels added).  
254x190mm (96 x 96 DPI)





Mapping the extended Pompeian assemblage due to the fourth pyroclastic surge to the 'enchainment v containment' grid of forces framework (After Lucas 2012, Figure 16, p. 213, Disintegration and Colonization classification labels added).  
 254x190mm (96 x 96 DPI)

View Only