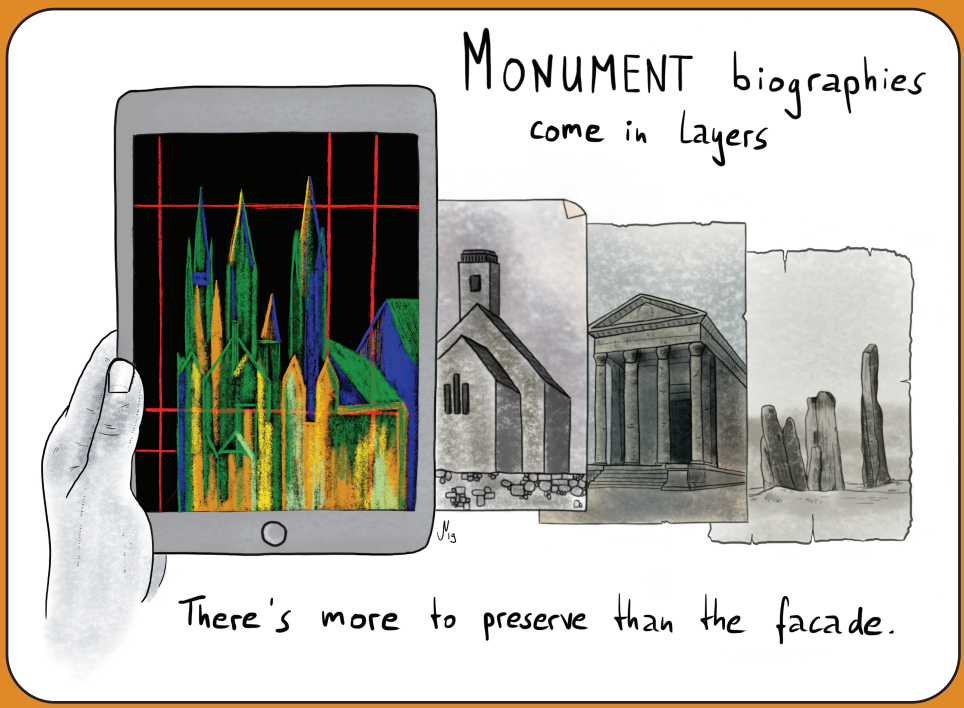
EPOIESEN



A Journal for Creative Engagement
in History and Archaeology

Volume Three

EPOIESEN

A Journal for Creative Engagement in History and Archaeology

Volume Three

The Digital Press at the
University of North Dakota
Grand Forks, ND

DOI
http://dx.doi.org/10.22215/epoiesen

ISSN 2561-2379

ISBN-13: 978-1-7345068-0-8

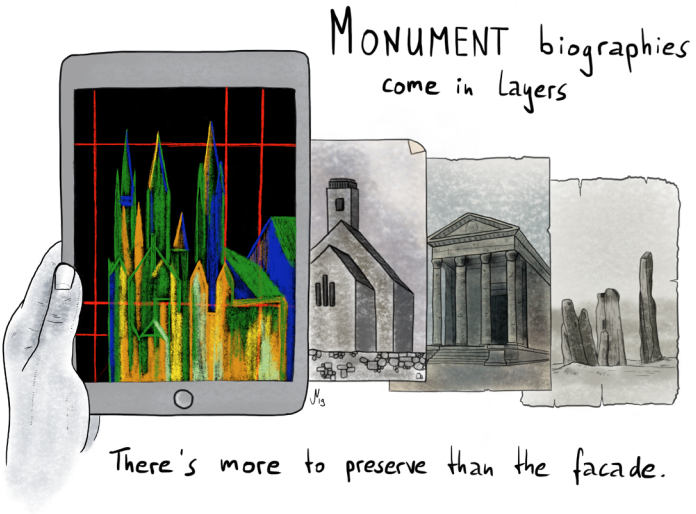
Cover Design: Andrew Reinhard
Cover art courtesy of Jens Notroff

Interior Design: William Caraher

Table of Contents

Editor's Note: Everything is Phygital

Shawn Graham



Citation:
Graham, Shawn. 2019. "Editorial Note: Everything is Phygital" *Epoiesen*
http://dx.doi.org/10.22215/epoiesen/2019.12

Shawn Graham is an Associate Professor in the Department of History at Carleton University.
ORCID: 0000-0002-2887-3554.

Cover image by Jens Notroff

Volume 3

The cover of this year's print edition of *Epoiesen* (volume 3) features artwork by archaeologist Jens Notroff. Jens is also an illustrator and science communicator. His piece, "Monument Biographies Come in Layers" reminds us that there's more to preserve than the façade. I take this as a call to remember the intangible aspects of not just culture or heritage, but of the digital work through which more and more we are coming to know the past.

As I look at the work, I imagine a single site, a place of power in the landscape, evolving as the networks of power and ideology and imagination reconfigure around it over time, until it becomes 'phygital' in the sense that Dawson and Reilly discuss:

> A phygital nexus can be thought of as a no-place and an every-place where digital and physical worlds intersect; a space where novel, 'messy assemblages' can emerge

... they tell us. I'd like to think that that's what's happening here on *Epoiesen* this past year: a glorious space of messy assemblages of ideas, media, and making. Opitz calls this idea of the 'phygital' a 'modern transubstantiation' and provocatively asks, '...and so what if it is?' The answer, she says, is that it gives us license within our framework of rational science to connect and engage the mystical, the spiritual, or at the very least, the 'more-than-physical'.

It makes me wonder if perhaps there is a connection here with the work of the practitioners collected in the new volume on *Historic Landscapes and Mental Well-Being* edited by Timothy Darvill, Kerry Barrass, Laura Drysdale, Vanessa Heaslip and Yvette Staelens. Darvill writes, in the introduction to that volume, that well-being

> does not involve a single universal 'right' balance of these things [eg hope, charity, justice, creativity, etc] because the balance varies from person to person. As such, well-being is not so much about wellness per se as about a heightened sense of 'being', and an awareness of the continual process of 'becoming'. (Darvill et al, 2019, p5)

That 'heightened sense of 'being," I think, is consonant with what Sara Perry has argued for in the sense of archaeological enchantment, drawing on the work of Bennet, 2001. 'Disenchantment' is not a rational, clear-eyed view of the world; rather it is a blinkered shutting-off-of-possibilities. Thus enchantment is not about magical thinking but rather about opening to the sources of wonder in the day to day we encounter, and these encounters become what Perry calls 'seedbeds' for ethics of generosity and care.

It seems to me, and through no conscious planning on our part, that this past year of *Epoiesen* has been about pieces that sit at this intersection of the physical and digital world, that enchant us, and in that enchantment perhaps reminds us of the potential of archaeology and history to promote care, generosity, and well-being.

The pieces that we put online in 2019 all connect with the 'vibrant materiality' (Bennett, 2010) of the past, the vibrating chords that intersect and tie us to the past in the visions of the past that we create. It is an enchantment, of the kind that Fredengren (2016) describes in her work on Irish crannogs, the eruption of deep time into new and novel forms that stop and arrest us. Reinhard's work with found digital sounds and the act of assembling music from them takes the idea of 'vibrant' in an altogether new direction. Caraher and Smith's reaction to the piece, and the consideration of how the piece is affected by the materiality of their ability to listen, causes us to stop, pause, and realize that many of the assemblages (all?) that we deal with in archaeology only exist through other media. That their meaning is transformed.

It's all heady stuff. Morley, Dal Borgo, and Fragoulaki take us through playful engagement with a serious (and always politically relevant) Melian Dialogue, while Whittaker engages us in a visual dialogue about a single point in space that is encountered through the medium of the Twitter Conference. Loyless and Marsillo enchant us with papercraft (delivered digitally) and the ways memory and knowing are embodied in touch.

In which case, it seems that in 2019, everything is phygital.

References

Bennett, J. 2001. *The Enchantment of Modern Life: Attachments, Crossings, and Ethics*. Princeton (NJ): Princeton University Press.

Bennett, J. 2010. V*ibrant Matter: A Political Ecology of Things*. Durham: Duke University Press.

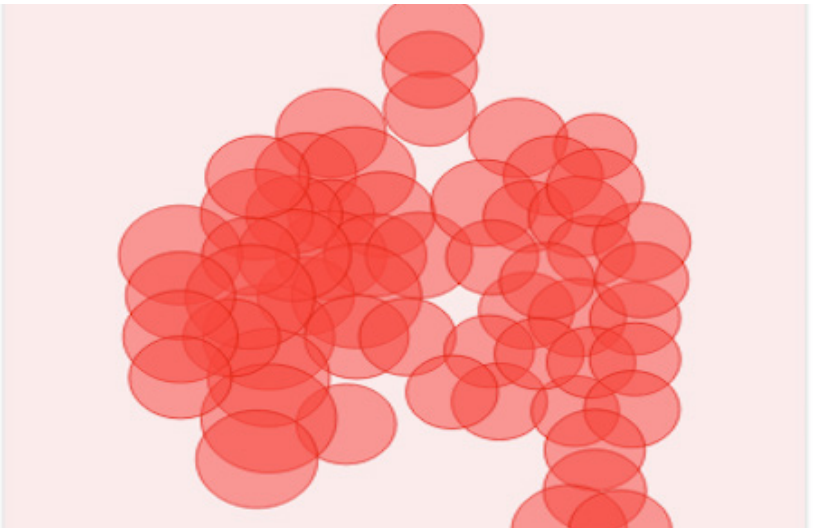
Darvill, Tim, Kerry Barrass, Laura Drysdale, Vanessa Heaslip and Yvette Staelens (eds). 2019. *Historic Landscapes and Mental Well-being*. Oxford: Archaeopress.

Fredengren, C. 2016. Unexpected Encounters with Deep Time Enchantment: Bog Bodies, Crannogs and 'Otherworldly' Sites. *World Archaeology*, 48: 482–99

Perry, S. (2019). The Enchantment of the Archaeological Record. *European Journal of Archaeology*, 22(3), 354-371. doi:10.1017/eaa.2019.24

The Melian Dilemma: Remaking Thucydides

Neville Morley



Citation:
Morley, Neville. 2019. "The Melian Dilemma: Remaking Thucydides"
Epoiesen http://dx.doi.org/10.22215/epoiesen/2019.2

Neville Morley is Professor of Classics & Ancient History at the University of Exeter, UK, and blogs at The Sphinx Blog. ORCID ID 0000-0003-0721-715X

Cover image courtesy of Neville Morley

Introduction: the Thucydides Paradox

There is a long-standing tradition of reading Thucydides' work as a source of political lessons and/or an exercise in political education. This is grounded in Thucydides' own claims for it as a 'possession for ever', inviting readers to compare the events he describes with present and future events which will, 'because of the human thing', resemble them. The problem is how this idea is realised in practice. Within historiographical traditions, Thucydides' claim is assumed to extend to history in general, not just his own work, and taken to imply the usefulness of knowledge of the past as an end in itself, or at best as a source of crude analogies for present events. In political theory, on the other hand, Thucydides' work is often read as a precursor of normative social science, ignoring its many rhetorical and literary complexities; the absence of statements that can be identified as normative political principles and so claimed as Thucydides' intended lessons is remedied by taking the statements of characters in his account as expressions of Thucydidean political theory. The most famous example is the way that the claims of the Athenians in the Melian Dialogue are taken, without discussion, to be both the opinion of Thucydides and a true account of the world; hence the idea that he should be seen as the founder of 'Realism', establishing the theory that the world is anarchic and that 'the strong do what they want' (Morley 2018).

The Thucydides paradox is that in both cases the authority of a complex, ambiguous author is invoked to support a simplistic, reductivist version of his alleged ideas. The historians ignore the fact that Thucydides' devotion to establishing the truth of past events is a means to an end, not the end itself, while the political theorists ignore the obvious fact that, as Thomas Hobbes had observed, Thucydides never offers precepts or explicit lessons (Hobbes 1629: xxii). The former

group elevate historical specificity and ignore the general; the latter elevate the general and ignore the details – and neither group pays any attention to the particular and peculiar nature of Thucydides' chosen forms of representation, but simply assume him to be writing more or less according to their own generic expectations (Greenwood 2006; Morley 2016).

The present project is part of a wider exploration of the potential for developing Thucydides as a resource for enhancing political literacy and understanding; not as a source of a few universalising principles or maxims that are assumed to explain events in simple terms (compare the 'Thucydides Trap' idea applied to relations between the US and China), but as an education in the complexity of the world and the unpredictable nature of events – and the extent to which humans are prone to cognitive bias in trying to think about such things. It seeks to explore the Melian Dialogue as a confrontation between two different world views, the powerful and the powerless, neither of which should be trusted, as well as a depiction of a situation in which counterfactual possibilities – the question of whether things could have turned out differently, and the question of what might have had to be different in order for things to turn out differently – are constantly raised or implied.

But it is not enough simply to offer a different interpretation of Thucydides – these are common enough, and the idea that the Melian Dialogue can be read as a critique of Realism is nothing new (Johnson 1994). The problem with contemporary evocations of Thucydides and his political message is not just that they present a version of his ideas that is simplistic and arguable at best. Equally problematic is the elitist dimension to this appeal to authority; the undeniable difficulty of Thucydides' work is taken not as an incentive to explain and explore but as a means of establishing the writer's own superior education and understanding, with the implication that true understanding can be gained only through lengthy engagement with the entire text and the tradition of scholarship. It is certainly the case that one problem with Realist readings of the Melian Dialogue is their failure to consider what happened to the Athenians afterwards – but does that mean that any reading of sections of Thucydides' work, rather than the whole thing, is unavoidably flawed?

The challenge for any attempt at setting up Thucydides as a resource for political education is that his work is long, sometimes tedious, and often inaccessible; how can it be made usable, without stripping out

the ambiguity and complexity that is (I would argue) the point of the exercise? One of the basic principles of this project is that Hobbes had the answer:

> Digressions for instruction's cause, and other such open conveyances of precepts, he never useth: as having so clearly set before men's eyes the ways and events of good and evil counsels, that the narration itself doth secretly instruct the reader and more effectually than can possibly be done by precept. (1629: xxii)

'The narration itself doth secretly instruct the reader' – anticipating by nearly 350 years Hayden White's insights into 'the content of the form' and the fictions of factual representation (1987); still more is this the case in those passages in Thucydides where he breaks from narrative to explore other means of communication. In the notoriously problematic speeches, we are not presented with the historian's own account of the speaker's character and ideas; rather, we are (or feel ourselves) addressed by the speaker, seeking to persuade us and perhaps at the same time inadvertently revealing something of themselves, and we are (or feel ourselves) placed in the same position as that speaker's original audience, struggling to evaluate their words and decide on the right strategy (cf. Foster 2010). In the Melian Dialogue, we are presented with a tragic agon, bringing the arguments to life and pulling our sympathies backwards and forwards, with the painful knowledge of where this is actually going to end (Hardwick 2015).

Thucydides' freedom from generic conventions and willingness to experiment with rhetoric and form in order to help his readers understand the world surely gives us licence to experiment ourselves. Tragedy is not the only thing that the Melian Dialogue brings to mind; as exponents of game theory like John van Neumann, Thomas Schelling and Yanis Varoufakis have recognised, it also resembles the world of the Prisoner's Dilemma and other games (Morley 2015; Dal Borgo 2016). Turning it into a playable game also, potentially, overcomes the common obstacle to academic work having any 'impact'; namely, if there is not already a natural audience or existing demand for what you have to offer, why should anyone be interested in having their assumptions unsettled? The aim is therefore to create a game that is sufficiently interesting and/or pleasurable to play in its own right, that can then help to lead the player towards a deeper understanding of the broader political issues.

Game Framework

The Melian Dialogue can in fact be imagined as several quite different sorts of games. One approach, that followed by game theorists, is to focus on the situation itself, and I have developed two card-based games focused on contests in which different sorts of imbalance are built in. Both games are interesting enough to play on a single occasion, as a basis for structured discussion afterwards, but only one of them would conceivably merit repeat plays for pleasure.

The main game focuses more on the text of the Dialogue and the decisions made by its protagonists; it turns it into a piece of interactive fiction, reminiscent of the 'choose your own adventure' genre, in which the player takes the role of either the Athenian commander or one of the leaders of the Melians, and works their way through a series of choices and their consequences. They encounter at least some of the words spoken by their opponents in the original, and face at least some of the same dilemmas – but also others, if their decisions lead them in directions which are only implied counterfactuals in Thucydides' account. The range of possible outcomes is of course larger than the single historical result.

The obvious, if not inevitable, tool for constructing the game was Twine (version 2.2.1, using the default Harlowe format), which is designed specifically for the creation of branching narratives in which the player reads some text and then chooses between a limited number of options by clicking on hyperlinks which take them to new passages of text. Twine and its potential have been discussed and demonstrated in previous *Epoiesen* pieces by Lucas Coyne (2017) and Jeremiah McCall (2018), and I have little to add to their comments except to stress how easy it is to use. For the most part, the Melian Dilemma is extremely simple, relying almost entirely on simple hyperlinks between passages (the story map, with some narrative choices looping back on themselves, is rather more complicated, see Figure 1).

There are just two respects in which I have taken advantage of the macros that can be added to Twine stories. The first is to introduce an element of randomness into the results of choices, using the (*either:*) macro, so that a player clicking on certain hyperlinks may end up in one of two different narrative arcs – reflecting the obvious truth that events are never wholly determined by the decision of one party, but that the opposition are also making critical decisions. The second uses the (set:)

macro to create a variable that increases by 1 every time the player has another go at the Melian role; after a certain number of tries, the (if:), (else-if:) and (else:) macros allow the unlocking of new possibilities.

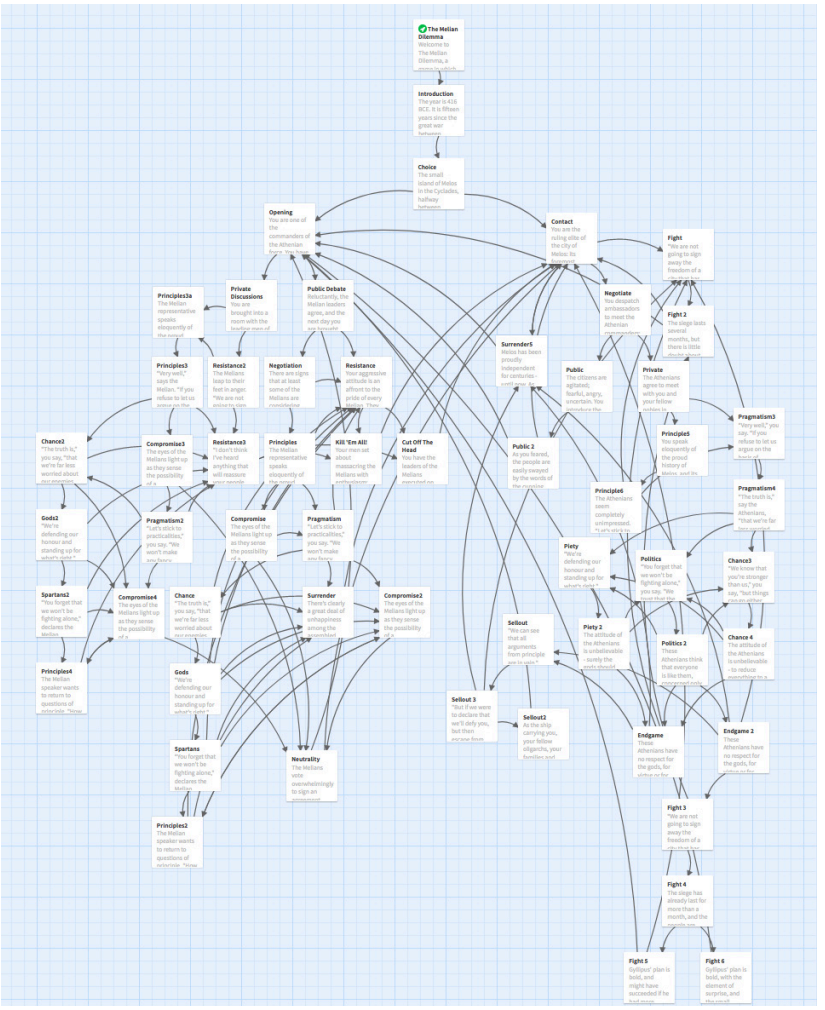


Figure 1, Representing the Story Map within Twinery

Design and Gameplay Issues

The development of the game involved two separate processes. The first was the modelling of the Melian Dialogue itself. I edited and adapted the text, having made the decision early on to use a compressed version which seeks to distil the essence of the most important exchanges and arguments, rather than asking players to work through the entire negotiation as originally written, and divided it into manageable sections (not least to avoid where possible players having to scroll down). In parallel, I constructed the underlying decision tree, to identify points where one might surmise a choice was made by one or other party, whether to adopt one line of argument or another or to respond to the claims of the other side – or, eventually, to break off discussion.

The second process was more complex and speculative: identifying the whole range of outcomes which would be possible if a player chose not to follow the same route as the historical actors. One starting assumption was that there is no specified goal, whether you are playing Athenians or Melians, and certainly historical accuracy is not required or prioritised (though of course one can always play the game historically, in which case you do tend to end up with the expected result, but perhaps with more insight into the factors which shaped the decisions of both sides). Rather, it is open to the Athenians to seek to avoid conflict if at all possible, or to the Melians to surrender rather than sacrifice the city in the name of sovereignty. Of course, the response that players can expect from the other side is historical – if you are playing the Melians, the Athenians will not suddenly relent and sail away.

As the more powerful side, the Athenians have much more freedom of action. If the player defines 'winning' solely in terms of the conquest of Melos, they will always win; the question is whether they feel comfortable with the values and assumptions they thus re-enact (or with the implication that it is this winning mentality that leads Athens into disaster in the future). Only if the player aims at finding a less bloody resolution do other factors come into play, including the use of Twine's (either:) macro to create the possibility that e.g. the Melians might sometimes be persuaded to be more reasonable but will never wholly lose an inclination to defend their sovereignty.

The Melians' basic choice is between surrender and death – arguably, they get to decide between different ways to lose (and different paths to that end). But there are three main additional possibilities.

Two of these pick up on a point in Thucydides' account that is sometimes overlooked: it is not the Melian people but their leaders who negotiate with the Athenians and decide that sovereignty is more important than safety, and this might imply that the fates of the people and their leaders might be different, rather than everyone perishing together. The third possibility is firmly excluded by Thucydides, and it is interesting to note that a limited Twitter poll suggested that most (60%) of respondents agreed with him, but a plausible historical argument can be constructed for allowing at least a small chance in the game that the Spartans will turn up to rescue Melos (cf. Morley 2019). This latter possibility is unlocked only after playing the Melian role several times; the point is not to create a challenging route to victory that a player might stumble across through luck the first time they play, but rather to emphasise the unlikeliness of such an outcome and raise the question of whether it is rational to gamble the fate of the whole city on that chance.

Using the Game

It should already be clear how far the game design is consciously didactic; it aims not to teach a specific lesson, but to highlight the issues and assumptions involved in choosing a goal and selecting between options, for either side, and the way that the situation sets limits on what either side can do. For the moment, those playing the game online are free to ignore such issues altogether, however much the text tries to prompt them, and to treat it simply as an intellectual exercise. In due course I plan to incorporate the game into a website which will make the issues more explicit, and potentially gather data about people's responses (if only on the frequency with which people arrive at different outcomes).

Primarily, however, the game is intended to be used in the classroom or as part of a workshop; students (in the broadest sense) can either play the full version solo or in pairs and then join in a discussion afterwards, or the whole group can be led through a simplified version of the game (still in preparation) by a facilitator, so that the issues involved in each decision are discussed before each choice is made. In either case, students can then be asked to reflect on individual passages from the Melian Dialogue, to weigh up their arguments and assumptions and consider possible analogies with the present day; and the whole thing can be set in a wider context by viewing a video adaptation (see Might

and Right) or short video lecture Thinking Through Thucydides. My colleague Lynette Mitchell and I are collaborating with The Politics Project, an NGO dedicated to enhancing political literacy in schools through workshops and digital surgeries (workshops), to create a set of three one-hour workshops built around this game as well as the two card-based ones – but the game can certainly be adopted as a resource by other schools and other non-profit organisations (we would simply like to be given credit, and receive reports of how it goes).

Again, it would be interesting to collect data on how players approach the game: on the first occasion this exercise was tried out with a non-academic group (from the University of the 3rd Age in Dartmouth, Devon), the 'Melians' started out relatively calm and reasonable, and became progressively more belligerent as the dialogue continued, as they felt trapped by Athenian intransigence. This does suggest wider potential for the game as an exercise in understanding negotiation and conflict, for example for civil servants and business people…

Play The Melian Dilemma, hosted on Philome.la.

An archived copy, as of February 6th 2019, can also be played via Github: https://epoiesen.github.io/artefacts/The_Melian_Dilemma_v6.html

References

Coyne, Lucas. 2017. "Destory History". *Epoiesen* DOI: http://dx.doi.org/10.22215/epoiesen/2017.

Dal Borgo, Manuela. 2016. "Thucydides: Father of Game Theory", PhD, University College London. Link Foster, Edith. 2010. *Thucydides, Pericles, and Periclean Imperialism*, Cambridge: Cambridge University Press

Greenwood, Emily. 2006. *Thucydides and the Shaping of History*, London: Duckworth

Hardwick. Lorna. 2015. "Thucydidean Concepts", in C. Lee & N. Morley (eds.) *A Handbook to the Reception of Thucydides*, Malden MA: Wiley Blackwell, 493-511

Hobbes, Thomas. 1629. *'To the Readers', in Eight Books of the Peloponnesian Warre Written by Thucydides the Son of Olorus: Interpreted with Faith and Diligence Immediately out of the Greek by Thomas Hobbes*, London: Henry Seile

Johnson, Laurie M. 1994. "The Use and Abuse of Thucydides in International Relations", *International Organization* 48.1: 131-53. DOI: http://dx.doi.org/10.1017/S0020818300000849

McCall, Jeremiah. 2018. "Path of Honors: Towards a Model for Interactive History Texts with Twine". Epoiesen. DOI: http://dx.doi.org/10.22215/epoiesen/2017.16

Morley, Neville. 2015. "The Melian Dilemma: Varoufakis, Thucydides and Game Theory", The Sphinx Blog 27/3/2015. https://thesphinxblog.com/2015/03/27/the-melian-dilemma-varoufakis-thucydides-and-game-theory/

Morley, Neville. 2016. "Contextualism and Universality in Thucydidean Thought", in C. Thauer & C. Wendt (eds.) *Thucydides and Political Order: Concepts of Order and the History of the Peloponnesian War,* Basingstoke & New York: Palgrave Macmillan, 23-40

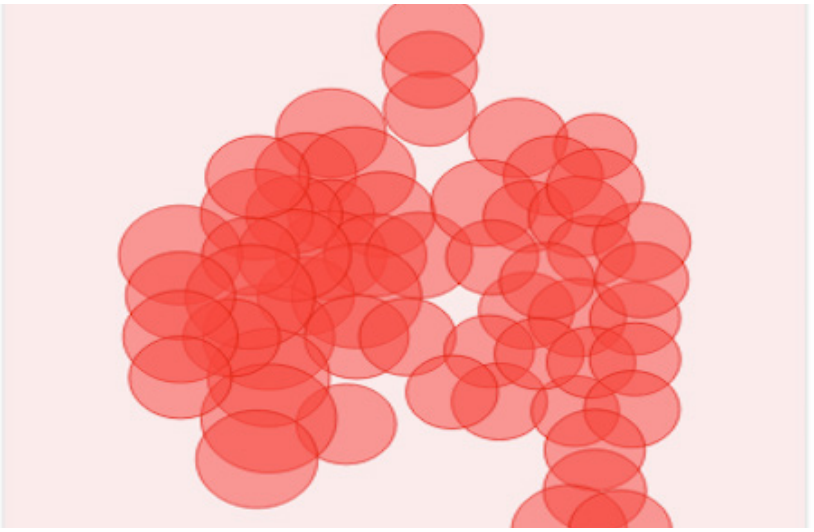
Morley, Neville. 2018. "Thucydides: the Origins of Political Realism?", in M. Hollingsworth & R. Schuett (eds.) *The Edinburgh Companion to Political Realism*, Edinburgh: Edinburgh University Press, 111-123

Morley, Neville. 2019. "They Win Again?", The Sphinx Blog 24/1/2019 https://thesphinxblog.com/2019/01/24/they-win-again/

White, Hayden. 1987. *The Content of the Form: Narrative Discourse and Historical Representation*, Baltimore: Johns Hopkins University Press.

The Melian Dilemma: Remaking Thucydides: First Response

Maria Fragoulaki



Citation:
Fragoulaki, Maria. 2019. "The Melian Dilemma: Remaking Thucydides: First Response"
Epoiesen http://dx.doi.org/10.22215/epoiesen/2019.6

Maria Fragoulaki is Lecturer in Ancient Greek History at Cardiff University.
ORCID ID: 0000-0003-2192-5785.

Cover image courtesy of Neville Morley

Ambiguity, innovation, and (political) education for the 'many'

The 'Melian Dilemma' is an innovative and ambitious experiment in producing an online interactive game based on the 'Melian Dialogue', one of the most well-known, read and discussed debates in Thucydides' History of the Peloponnesian War, in and outside classics. Instead of being an exchange of longer speeches, as is the case with all other debates in Thucydides, this debate is shaped as a dialogue, that is, a chain of shorter exchanges between the representatives of each city who take part in the debate, Athens and Melos. So being a unique occurrence in terms of its form, the Melian Dialogue is an experiment and an innovation by Thucydides himself. As Neville Morley (NM) points out, Thucydides' 'willingness to experiment ... surely gives us license to experiment ourselves' (Introduction § 6).

The Dialogue presents many challenges: there is a high degree of ambiguity and abstraction and a detached and intellectual tenor in the exchanges of the interlocutors. These features are typical of philosophical and sympotic contexts, rather than interstate negotiations in the context of a life-threatening military operation against a whole community, as is the case of the Athenian agression against the Melians. It is the text's resistance to straightforward or 'easy' comprehension that creates the Thucydides' paradox, as NM notes. Despite its complexity, the text has a universal dimension too, outside its historical here-and-now (the Peloponnesian War in fifth-century BCE Greece). The temptation for politicians, commentators, thinkers and groups of all historical periods to extract useful political lessons of general value out of this Dialogue has been irresistible. The price of this process is often an oversimplification which ignores the details (NM, Introduction §2), reducing the Dialogue's (and Thucydides' at large) subtle argumentation and historical thinking to 'universalising principles or maxims that

are assumed to explain things in simple terms' (NM, Introduction, §3): a sort of Procrustean bed which 'severs' the text as regards not only its historical context and specificity, but also its intellectual and argumentative subtlety.

For example, does the Dialogue teach us that the powerful must win and the powerless must fall? A possible answer is 'Yes', since the Athenians do conquer the island after all. This is indeed the expected outcome, in the light of the Athenians' own imperialistic rhetoric in the Dialogue. Yet the Athenian rhetoric exposes the fears and weaknesses of an imperialistic power too, the very factors that provide room for negotiation. As for the Melian rhetoric, it is not the sort of thing that powerless people say to the powerful, in order to save their lives. As hinted above, the Melians are implausibly composed and 'academic', and their words reveal not only the weaknesses, but also the strengths and sources of confidence and mental stamina of those who do not possess the military power. Although the Melians are subjugated by the Athenians in the end, their subjugation proves a problematic and long-term operation. As Thucydides writes in his own voice (that is, outside the Dialogue), it happens after a prolonged siege and only after treason among the Melians. He also says that the Athenian assault, which takes place in the context of the Melian Dialogue, is not the first time the Athenians have tried to conquer the Melians. These qualitative features put the Melians' mental and moral strengths in perspective, and complicate the schema 'powerful Athenians vs. powerless Melians'. Things become even more complicated when one considers that Thucydides must have deliberately downplayed Melos' resources (Kallet 2001), in order to create the 'powerless Melians' that fitted his historical lesson. So a degree of unpredictability regarding the outcome of this confrontation is inscribed within the historical situation itself (that is, the fifth-century power relations).

The 'Melian Dilemma' is a modern creative remaking of Thucydides' Melian Dialogue in the shape of an online game to be used as 'a resource for enhancing political literacy and understanding' (NM, Introduction §3). The game format entails shortening of the text and elimination of some of its complexities. The links in the section 'Using the Game' provide useful context, also showing that the 'Melian Dilemma' is part of a wider and long-term engagement with Thucydides' use in modern educational contexts. The online video 'Might and Right' illustrates the remaking of the text involved and the pedagogic value of role playing.

The player is invited to actively participate in decision-making and counterfactual thinking, by exploring lines of argument and potential outcomes. The game animates discussion, review and choice among alternatives that can be tried and re-tried/re-played. The possibility itself of replaying and negotiating history is empowering and constructive and a major gain in educational contexts. Presently the number of alternative options out of which the players can choose is restricted, but there is clear potential for more elaborate applications (see also below). The game is an exercise in problem-solving and strategic foresight, core values of effective policy in many areas beyond International Relations (e.g. citizenship, employability etc.) Strategic foresight features prominently in Thucydides as key to good political leadership ('pronoia' in Greek).

The game will be particularly, but not solely, useful and welcome in teaching environments, especially in classrooms. Reader-response theory and in particular the concept of 'interpretive communities', closely connected with Stanley Fish (1980), can be illuminating in this connection. Reader-response theory shifted the focus from the text as a fixed entity to the reader and their experience in structuring meaning through the process of reading-receiving the text (Tompkins 1980). The group discussion that the game generates in a classroom is an excellent exercise of collective negotiation of meaning and interpretation in the face of ambiguity and unpredictability. Although its context is that of IR, the game enhances the trasferrable skill of democratic literacy too, since it enacts a context of individual and collective participation, responsibility, and decision-making.

Games related to the classical antiquity (online and more conventional card or board ones) is a burgeoning global market today. As someone who teaches ancient Greek history, literature, and language in higher education in the UK, I can easily imagine the 'Melian Dilemma' animating discussion and promoting teamwork in the classroom. Pedagogical literature stresses the centrality of experience, experimentation and active roles and techniques, game being one such technique, in a holistic and dialectic approach to learning and teaching (Kolb 2015). By transferring and negotiating authority from – and between – teacher and students, the game promotes a more interactive, inclusive, and dynamic model of learning and teaching. These are big questions and desiderata in education today, especially in classics and the humanities.Part of the game's political education and message is the

creative connection between education and the outside world: The role of the 'involved student' interacts, in a transferrable manner, with the role of the 'involved citizen' with mutual benefits for each role. Through the game format, the 'Melian Dilemma' makes Thucydides a popular and accessible source of knowledge, widening the base of those who have access to a 'difficult' classical text, at times perceived as socially exclusive and elitist. A collateral benefit of the game is the realisation that 'Melian Dialogues' are played in different social and interpersonal contexts: living rooms, bedrooms, offices, and teaching classrooms themselves (of ancient history and other disciplines). Thus the 'Melian Dilemma' provides the potential to teach power relations and negotiation of hierachies outside politics, connecting a lesson of politics and war with real-life experience.

Target groups, pleasure, and the way forward

Since the game is primarily intended to be a tool of political literacy and education, it is important to identify more precisely 'Who will be educated and benefit from the "Melian Dilemma"'. The question of target group(s) is an important one, since the very notion of Thucydides' 'difficulty' is relative and applicable only to some environments. In the light of Fish's (1980) interpretive communities, mentioned above, difficulty/ease and ambiguity/stability of meaning depend on time, place and audience. If classicists need dictionaries and commentaries to illuminate linguistic, stylistic, and historical problems of Thucydides' text, political or social scientists read in it basically a story of war between two superpowers; it might be a pretty long read but rather easy to understand in its broad lines and comparative potential (e.g. Sahlins 2004).

Different students/players of 'The Melian Dilemma' have different needs and interests and are likely to receive different lessons. More reflection on the question of different audiences, potential aims and outcomes of the game would produce adaptations, refinements and variants, which would in turn generate more refined and diverse discussions of the problems involved with the students. For example: in the game's present version 'the gods' is a term that stands as a comprehensive signifier of moral considerations and arguments. An elaboration of the 'gods' category would include variants such as 'justice', 'loyalty', 'shamefulness', 'honour', kinship' or 'morality', which would sharpen the

focus of discussion and raise awareness of inter-related epistemological fields involved, such as the social history and literature of ancient Greece, Ethics and IR, social science etc.

Such an elaboration relates to the question of digital technology and a software that could produce a game of increased unpredictability, open-endedness, and pleasure. I would like to imagine a version with more options of diplomatic negotiation and compromise. Contingency is another parameter that could be factored into a future version of the game, stretching open-endedness even further: for example how would natural disasters/phenomena, such as earthquakes or fires (which are recorded by Thucydides elsewhere) could have interacted with the historical outcome of the Athenian assault against Melos? This would facilitate intra-textual references and comparative discussion with other sections of Thucydides, such as the siege of Plataea. In addition to the educational benefit, a technologically more sophisticated game would probably produce a more adventurous interactive sensory environment (potentially a 3-D video game), which would enhance pleasure. The 'Melian Dilemma' provides an innovative tool to access the lessons of a challenging and fundamental classical text: a project with great educational-technological potential, for now and the future.

Works Cited

Fish, Stanley E. (1980) *Is There a Text in This Class? The Authority of Interpretive Communities*. Cambridge, Mass.: Harvard University Press.

Kallet, Lisa (2001) *Money and the Corrosion of Power in Thucydides: The Sicilian Expedition and its Aftermath*. Berkeley, Calif.: University of California Press.

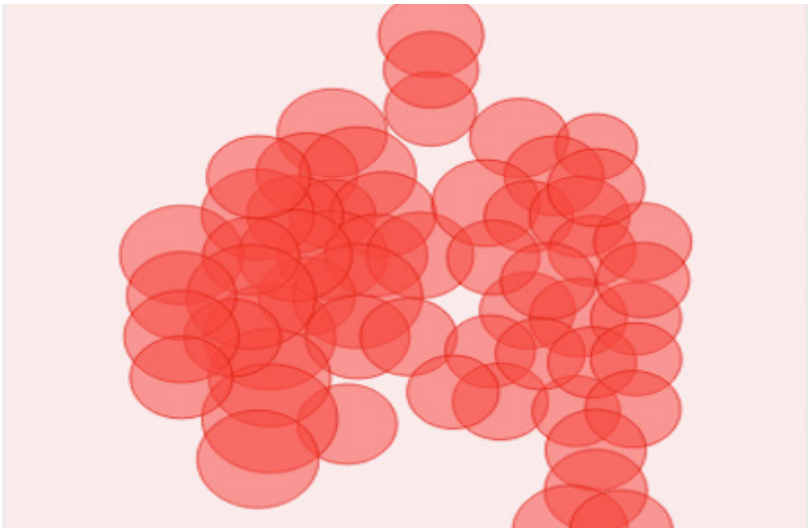
Kolb, David A. (2015) *Experiential Learning: Experience as the Source of Learning and Development* (Second Edn.) New Jersey: Pearson Education Inc.

Sahlins, Marshall (2004) *Apologies to Thucydides. Understanding History as Culture and Vice-Versa*. Chicago and London: The University of Chicago Press.

Tompkins, Jane P. (ed.) (1980) *Reader-Response Criticism: From Formalism to Post-Structuralism*. Baltimore, Maryland: The Johns Hopkins University Press.

The Melian Dilemma: Remaking Thucydides: Second Response

Manuela Dal Borgo



Citation:
Dal Borgo, Manuela. 2019. "The Melian Dilemma: Remaking Thucydides: Second Response" *Epoiesen* http://dx.doi.org/10.22215/epoiesen/2019.11

Manuela Dal Borgo is British Academy Postdoctoral Fellow, Faculty of Classics at Cambridge University.

Cover image courtesy of Neville Morley

Game theory and the Melian Dialogue

It is clear that Thucydides had "games" in mind whilst writing, editing and rewriting his History – his devotion to the theme of the agon – literally the "contest" or "struggle" attests to it. Thucydides' gamification is so patent that my doctoral thesis attempts to show that he may have described events with more rigour than we had previously imagined possible.[1] Historical characters are imbued with an introspective dialogue that appears as if each one were constructing a game of cunning strategies that considers possible actions and each outcomes' payoffs. Recorded actions and private thoughts are intertwined throughout. Neville Morley's gamification of one of Thucydides' most famous episodes is a natural outcome from reading Thucydides' text. Others have recently made this connection as well. Morley blogs about how a notorious game theorist and former finance minister of Greece, Yanis Varoufakis, wrote a paper inspired by the episode.[2] Nonetheless, Thucydidean scholars on the whole admit that "he never offers precepts or explicit lessons", as Morley writes, rightly pointing to Hobbes who best stated the problem.

Like many of Thucydides' gem set-piece narratives, the episode within which the dialogue sits (5.84-116) has been interpreted in an almost endless number of ways. The interpretation I offer below is a variant form to Morley's interpretation, in that it falls within Morley's umbrella framework of gamification but seeks to be a more 'rigourous' method – to use the lingo from the discipline of economics – which merely means that it restricts our view of how thoughts explain a player's actions. It is not better or worse than other methods, just different.

---

[1] Dal Borgo (2016).

[2] Morley (https://thesphinxblog.com/2015/03/27/the-melian-dilemma-varoufakis-thucydides-and-game-theory/); Varoufakis (1997), (2014).

The temporal structure of the narrative and a player's power to affect another's action is of paramount importance for a game theoretic analysis. A couple of questions need to be clearly answered for the Melian Dialogue to be described accurately. Which player was the first or second mover? Whose actions determined the outcome? Once these questions are answered the game is fully described. Only then can we can find what game theorists call a 'solution' – in other words, the most likely course of action taken by each player given their possible payoffs. This solution should in theory mimic the historical outcome and thus provide an explanation to why players acted the way they did. This is what we explore below.

Game theoretic analysis of the dialogue (5.84.1-114)

The Melian Dialogue is unique in its narrative structure, being the only dialogue in the History.[3] The narrative is introduced as a sort of negotiation, such that the Athenians send ambassadors to put forward a proposal to the people of Melos. Melos remember is a Spartan colony that refused to submit to the control of the Athenian empire and desired to remain neutral. The Athenians make a single offer, whilst the Melians attempt to negotiate for better terms, attempting to submit the offer to arbitration in order to revise it. Arbitration or any form of justice, the Athenians argue, is only possible among two players of equal strength and therefore their take it or leave it ultimatum is best suited for this situation.[4] The Melians attempt to grasp at moral and ethical reasons for why the Athenians should reply to a counter offer. The Athenians stand by their ultimatum and enforce it, simply because these generals are mandated negotiating agents.

[3] Hudson-Williams (1950) 156-69; Macleod (1983) 52-54, on the rhetorical form of the dialogue as a "common deliberation", unlike a Platonic dialogue taking the form of consistent questions and refutations; CT. 3.216-225 for bibliography.

[4] Chwe (2013) 222-224, on bargaining and status as a commitment device. "If I am stronger than you, I do not need to consider your situation because nothing you do can help or harm me."

Temporal structure

The basic temporal structure of the negotiation is clear in that there is a proposal on the part of the Athenian ambassadors, followed by a reply on the part of the Melian magistrates and ruling men. The Athenians **make a proposal** (**λόγους** πρῶτον **ποιησομένους** ἔπεμψαν πρέσβεις, 5.84.3). The narrative is only a conversation or dialogue because the Melians insist on holding the meeting in private before the magistrates and leading men. The ambassadors therefore request permission to deliver their offer informally (καθ᾽ἡσυχίαν = lit. 'at leisure', to take their time or informally, 5.86),[5] since there would be no formal proposal to the people. The usual form of address, as the ambassadors point out, would have been in the form of **a single continuous speech** before the popular assembly (μὴ **ξυνεχεῖ ῥήσει... ἑνὶ** λόγῳ, 5.85). Thus, the Athenians ask for permission to make their proposal informally: "And firstly say if what we are saying is to your liking" (καὶ πρῶτον εἰ ἀρέσκει ὡς λέγομεν εἴπατε., 5.85). The Melians grant it: "Let the negotiation be in the way you propose, if it seem good to you" (καὶ ὁ λόγος ᾧ προκαλεῖσθε τρόπῳ, εἰ δοκεῖ, γιγνέσθω, 5.87). A dialogue or conversation ensues.

Content of proposal

Both agree that their negotiation is about the survival of the Melian state (περὶ σωτηρίας, 5.87 and 5.88). The Athenians will grant them survival if they submit as subjects to the Athenian empire. Given the Melians are inferior in strength to themselves, the Melians should accept whatever the stronger is so kind to allow them to keep, in this case their lives (5.89). The Athenians insist that it is **common knowledge** (**ἐπισταμένους πρὸς εἰδότας**, lit. you know as we both know, 5.89) that expediency is justice. The Melians object to the Athenians' definition of expediency (to xumpheron, 5.90) and insist that the Athenians offer fair terms (to diakaion, 5.90) rather than merely survival, which amounts to slavery (douleian, 86). The Athenians retort that justice is only an option among parties that are to some degree equal.[6]

[5] Macleod (1983) 54, for κρίνετε as a word used in the assembly Cf. 1.87.2, 120.2; 2.40.2; 3.37.4, 43.5; 6.39.1).

[6] Bosworth (1993) 39, esp. 39ft.45 and 46."This does not of course imply that justice subsists between powers of approximately equal magnitude, as is commonly alleged. ... but that justice subsists between individuals who are to some

τὰ δυνατὰ δ᾽ ἐξ ὧν ἑκάτεροι ἀληθῶς φρονοῦμεν διαπράσσεσθαι, ἐπισταμένους πρὸς εἰδότας ὅτι δίκαια μὲν ἐν τῷ ἀνθρωπείῳ λόγῳ ἀπὸ τῆς ἴσης ἀνάγκης κρίνεται, δυνατὰ δὲ οἱ προύχοντες πράσσουσι καὶ οἱ ἀσθενεῖς ξυγχωροῦσιν.

We are concerned with the possible [actions] we both truly believe are done. You know, as well as we do, that within the limit of human calculation judgments about justice are made between those with an equal power to enforce it (lit. with equal necessity), otherwise possible actions are defined by what the strong do and the weak accept (lit. have to comply). (5.89)

This passage is often hailed as the source behind the realist jingle: might is right.[7] It is stern and calculating without a hint of emotional involvement. This is a recurring theme in Thucydides and other writers.[8] The dialogue revolves around the advantage (χρήσιμον) either side can persuade the other they can offer the other. After several tos and fros, the Athenians insist that the Melians' considerations of **future benefits and costs** are of no consequence, and that it is the present deliberation over safety, from which they have strayed, which is being considered (5.111.2, 5). The Athenians at the end of the conversation formally make **an offer** that the Melians become allies, which would allow them to keep their own land but must pay tribute.[9] These conditions are distilled into "**a choice between safety or war**" (**δοθείσης αἱρέσεως πολέμου πέρι καὶ ἀσφαλείας**, 5.111.4)

The Athenians **now withdraw from the negotiations** (**μετεχώρησαν ἐκ τῶν λόγων**, 5.112.1). The Melians deliberate amongst themselves and

degree equal and not between those who are blatantly unequal, as slaves and their owners." See Arist.NE.v.1131.a ff, Pol.3.1280a11, δοκεῖ ἴσον τὸ δίκαιον εἶναι, 1282.b.18.

[7] Mary Beard (2010) praising the accuracy of the translations in CT 3, "the most favorite of all Thucydidean catchphrases, repeated in international relations courses world over, and a founding text of the "realist" political analysis: 'The strong do what they can, the weak suffer what they must." … [Simon Hornblower's] more accurate translation is: 'The powerful exact what they can, and the weak have to comply.'" This version detracts from the jingle "might is right"; Welch (2003) agrees.

[8] E.g. 1.73.2, "it has always been established practice for the weaker to be ruled by the stronger", with HCT i.236-44; cf. Antiphon DK87 fr.44a ll.6-33

[9] CT 3.248-9.

reach the same conclusion they had before, which was **not to yield** (**οὐκ ἤθελον ὑπακούειν**, 5.84.2), and **reply** to the Athenians (**ἀπεκρίναντο** τάδε, 5.112.1-2). They will not accept (5.112.1-2), unless the terms are beneficial to both (5.112.3). After the Melian **reply** (**ἀπεκρίναντο**), the Athenians **dissolve the negotiations** (**διαλυόμενοι** ἤδη **ἐκ τῶν λόγων**) informing them of the consequences of their rejection: they will lose everything (5.113).

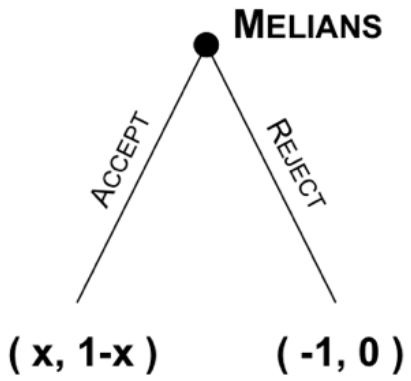


Figure A

This dynamic environment, although not immediately apparent as a result of the conversational format, is in fact an ultimatum. The Athenian offer is made only once and they withdraw to allow the Melians to make **one decision** (ἐς **μίαν βουλήν**, 5.111). It important to note that the form of the dialogue is an ultimatum but only if focalized through Athenian rhetoric.

Descriptive Theory

The Melian rhetoric strains to accomplish arbitration but fails due to Athenian intransience. The Athenians are concerned fundamentally with arguing why their offer is acceptable for the Melians; with persuading the Melians (*peistheisi*, 5.86). First, the Athenians emphasize that there is no deterrent mechanism to halt their actions. As a stronger state than Melos, Athens has no fear that they will be weaker

and therefore natural law necessitates (ὑπὸ φύσεως ἀναγκαίας) that the stronger rule the weaker (5.105.2, cf. 1.83).[10] Second, there is no possibility for renegotiation. The demos at Athens had voted, commissioned and deployed the military expedition to Melos with their instructions (στρατοπεδευσάμενοι, 5.84.3). The generals were executing orders and therefore were lacking in authority to make any compromise.11[11] The fact being that capitulation was not an option and that the form of capitulation would be by submission or annihilation. Submission they argued benefits both (5.91). The Athenians are constrained to set an offer that calculates the present alone to which the Melians initially agree to discuss (5.87) (Figure A).

The Athenians couch the arguments in terms of ***soteria*** or **preservation of the Melians' lives and territory** in return for the payment of tribute (5.88, 99, 111.4-5).[12] This, the Melians believe amounts to slavery (5.86, 92, 100) even though they concede that this would still ensure their safety (5.88).[13] We can assume that Melos' current status as independent, free and neutral (5.112.2) may be represented by the number 1, as in 100%, so that ***soteria*** is just a portion of that and may be represented by a proportion x. For example, x could be 20% or 60%

[10] In Melian Dialogue 5.105, 103, 111.4 in addition to references to the Melians as islanders 3.91; 5.84, esp. Athens master of the seas 5.97; In bk 5: 31; 33; 35.1; 39.1; 47.1; 54-6; 79.1; CT 3.216ff. This does not exclude a further layer that the Athenians do speak of danger 5.99 and also of other's perceptions that they are afraid 5.97. A richer model would be needed to include these factors.

[11] Bosworth (1993) 31-2; esp. Hobbes (1629) To the Readers: Thucydides "introduceth the Athenian generals, in a dialogue with the inhabitants of the Isle of Melos, pretending openly for the cause of their invasion of that isle, the power and will of the state of Athens; and rejecting utterly to enter into any disputation with them concerning the equity of their cause, which, he saith, was contrary to the dignity of the state. To this may be answered, that the proceeding of these generals was not unlike to divers other actions, that the people of Athens openly took upon them: and therefore it is very likely they were allowed so to proceed. Howsoever, if the Athenian people gave in charge to these their captains, to take in the island by all means whatsoever, without power to report back unto them first the equity of the islanders' cause; as is most likely to be true; I see then no reason the generals had to enter into disputation with them, whether they should perform their charge or not, but only whether they should do it by fair or foul means; which is the point treated of in this dialogue."

[12] Macleod (1983) 58, σωτηρία/ ἀσφάλεια are "key-words".

[13] Macleod (1983) 57; CT 3.220, 5.92, 94 slavery advantages the Athenians n.b. 5.93 ad loc. citing Canfora 58f. that Athenians agree with the assessment of slavery.

depending on whether you value freedom a little or a lot, respectively. The Athenian payoff from Melos' subjection is represented as (1-x) to describe the *transference of assets* and *regulatory power* from Melos to Athens. If the Melians reject, the destruction of Melos would mean the loss of life and country and is represented by -1, which describes the irreversible loss of "everything" (5.113, and 5.103,111.3). The Athenians believe that if Melos is destroyed they would retain their current hegemony without expanding the empire (5.97). This we can represent as 0, since nothing is accrued to the Athenian empire and the status quo is maintained for Athens. The costs of war are seemingly absent in the discussion, so likewise are not represented here.

Solution Theory

The Melians do not honour their initial agreement to consider the present circumstances (5.111). They understand the Athenian stance that the current state is already one of war and that the refusal to accept the offer of submission means the investment of the city (5.86). They nonetheless disagree with this Athenian stance regarding the state of the world, arguing that the Athenians should consider their future gains from Melian neutrality (5.98, 112.3). With the aid of hypothetical calculations about future consequences, the Melians themselves try to persuade the Athenians that there will be a great cost to Athenian hegemony if the Athenians besiege Melos (5.87-111). The dialogue is traditionally read in moral terms, reasonably, but this does not tell the full story. The Athenians close the dialogue pointing out the folly of their belief in Sparta, as well as their reliance on fortune (*tuche*) and hope (*elpis*). The Athenians continue the poetic 'present-future' or 'near-far' theme that the Melians judge (κρίνετε) the uncertain future to be clearer than the present (5.113, see 5.86,87).[14] Certainty of the present can be seen (τῶν ὁρωμένων) and miscalculations occur when this certainty is projected into the future.

Ober and Perry have argued that in Thucydides the correlation of hope and the over-estimation benefits have low-probability of success.[15] In game theoretic terms, this type of miscalculation is caused by weighing future prospects with greater certainty than they actually possess. This is called **risk-loving** or **risk-seeking** behaviour. Although

[14] CT 3.221.

[15] Ober, Perry (2014) 209-11.

the Melians have apparently fallen into this trap, the Athenians themselves seem to be prone to risk–loving behaviour too. This has not only been noted by the Corinthians' comparison between the risk-loving Athenians and risk-averse Spartans (1.70),[16] but also in the dialogue itself the Athenians assume throughout that Melos will lose if they choose to resist (5.103, 113).

In factual historical terms, the Athenians capture Melos with far greater difficulty than they led the Melians to believe in the dialogue. The Melians suffer from what the behavioural economists Daniel Kahneman and Amos Tversky call the ***certainty effect*** and the Athenians suffer from ***overconfidence***.[17] The former chooses "a small hope of avoiding a large loss" over a manageable failure, the latter of "exaggerated optimism", from which both over-weigh their probabilities of success. When states have conflicting estimates of the likelihood of victory and both sides are optimistic about their chances, a range for a bargaining agreement is obscured and limited. If both players are risk-loving, then the offer will be lower, and acceptance will require a higher offer in order for both to prefer agreement over the gamble of war. Conversely, when the expected payoff of success is calculated by risk-neutral or risk-averse players, there is always a bargaining range for agreement. A share of whatever is at issue is preferred to the downside of losing a war, regardless of whether it is a fifty-fifty chance or an even higher chance of winning.[18] The case in the Melian Dialogue is the reverse where the gamble, no matter how grim the odds, is preferred to any offer.

---

[16] Ober, Perry (2014) 215-18; Ober (2010) 65-87.

[17] Kahneman (2011) 310-21, 255-65; Kahneman, Tversky (2000) 36 "The overestimation that is commonly found in the assessment of the probability of rare events."

[18] Fearon (1995).

Melians Reject the Offer and Final Engagement

When the Melians reject the Athenians' offer, the Athenian ambassadors return to the encampment in the outskirts of the city.[19] The generals receive the news that the Melians **yielded nothing** (ὡς **οὐδὲν ὑπήκουον** οἱ Μήλιοι) and immediately invest the city (5.114.1).[20] The Athenian generals begin by **building a wall around** it (εὐθὺς … **περιετείχισαν κύκλῳ** τοὺς Μηλίους, 5.114.2). The Athenians allocate the wall-building work among the several cities (διελόμενοι κατὰ πόλεις) which had joined the campaign against Melos. Once built, the Athenians retreat "with most of their army" (τῷ πλέονι τοῦ στρατοῦ), leaving only a guard to besiege the place (**ἐπολιόρκουν** τὸ χωρίον, 5.114.2). Having successfully breached the siege twice against this partial force of the Athenians, the Athenians return with "the rest of the army" (στρατιᾶς … ἄλλης). The Melians were defeated by the strength of the siege and also with the help of traitors from within the city (5.116.3). It was not an easy victory at all! Nonetheless, the Athenians did succeed and killed all the men of military age, enslaved the women and children, and sent out 500 colonists to resettle the city (5.116.4). The result was the complete obliteration of the Melian state.

The Melian Dialogue Game

As a result of this particular interpretation of the narrative, the Melian Dialogue Game App which includes the Athenian and Melian biases has been coded in R using gtree, which was developed by Prof. Dr. Sebastian Kranz, and uploaded to shinyapps.io. This game App will is available here, for readers to play: https://melos.arch.cam.ac.uk/UltimatumGame/

[19] 5.114.1, καὶ οἱ μὲν Ἀθηναίων πρέσβεις ἀνεχώρησαν ἐς τὸ στράτευμα; Cf. στρατοπεδευσάμενοι … ἐς τὴν γῆν, 5.84.3.

[20] Note the difference between the single reply of the Melians who do not yield to this one thing = "nothing" (οὐδὲν), as opposed to the Athenians at 1.139.2 who do not yield to multiple things = "to any of these" (οὔτε τἆλλα).

References

Bosworth, A. B. (1993). "The Humanitarian Aspect of the Melian Dialogue". *JHS*, 113, 30-44.

Chwe, M. S. (2013). *Jane Austen, Game Theorist*. Princeton: Princeton University Press.

Dal Borgo, Manuela. 2016. "Thucydides: Father of Game Theory", PhD, University College London. discovery.ucl.ac.uk/1507820/

Fearon, J. D. (1995). "Rationalist Explanations for War". *International Organization*, 49 (3), 379-414.

Hobbes, Thomas. 1629. "To the Readers", in *Eight Books of the Peloponnesian Warre Written by Thucydides the Son of Olorus: Interpreted with Faith and Diligence Immediately out of the Greek by Thomas Hobbes*, London: Henry Seile

Hornblower, S. (1991-2008). *A Commentary of Thucydides*. Oxford: Oxford University Press. (cited as CT 3)

Hudson-Williams, H. L. 1950. "Conventional Forms of Debate and the Melian Dialogue." *American Journal of Philology* 71: 1956-69.

Kahneman, D., & Tversky, A. (2000). *Choices, Values and Frames*. Cambridge: Cambridge University Press.

Kahneman, D., (2011) *Thinking, Fast and Slow*. London: Penguin Books.

Macleod, C. (1983). *Collected Essays*. Oxford: Clarendon Press.

Morley, N. (2015, March 27) "The Melian Dilemma: Varoufakis, Thucydides and game theory" [Blog post]. Retrieved from https://thesphinxblog.com/2015/03/27/the-melian-dilemma-varoufakis-thucydides-and-game-theory/

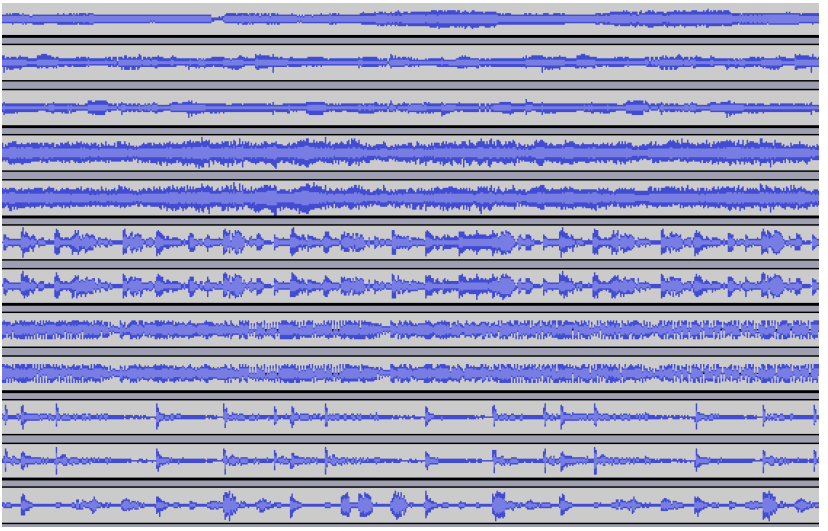
Ober, J., & Perry, T. (2014). "Thucydides as a Prospect Theorist". *Polis*, 31, 206-232.

Varoufakis, Y. (1997). "Moral rhetoric in the face of strategic weakness: experimental clues for an ancient puzzle". *Erkenntnis*, Vol. 46, 87-110.

Varoufakis, Y. (2014) *Economic Indeterminacy: a personal encounter with the economists' peculiar nemesis*, London & New York: Routledge.

Assemblage Theory: Recording the Archaeological Record

Andrew Reinhard



Citation:
Reinhard, Andrew. 2019. "Assemblage Theory: Recording the Archaeological Record"
Epoiesen http://dx.doi.org/10.22215/epoiesen/2019.1

Andrew Reinhard is the Director of Publications for the
American Numismatic Society.
ORCID ID: 0000-0001-7987-8227

Cover image courtesy of Andrew Reinhard

> Assemblage theory is an approach to systems analysis that emphasizes fluidity, exchangeability, and multiple functionalities. Assemblages appear to be functioning as a whole, but are actually coherent bits of a system whose components can be "yanked" out of one system, "plugged" into another, and still work. As such, assemblages characteristically have functional capacities but do not have a function—that is, they are not designed to only do one thing.
> —Texas Theory Wiki [http://wikis.la.utexas.edu/theory/page/assemblage-theory]

> An assemblage is an archaeological term meaning a group of different artifacts found in association with one another, that is, in the same context. An assemblage is a group of artifacts recurring together at a particular time and place, and representing the sum of human activities.
> —Colin Renfrew and Paul Bahn. 2008. *Archaeology: Theories, Methods, and Practice*. Thames & Hudson.

As an archaeologist, I constantly deal with the archaeological record, the body of physical evidence about the past. As a musician, I wanted to create my own archaeological record, one that adhered to archaeological rules/definitions. The resulting effort is a 41-minute, 8-song set of electronic dance music: *Assemblage Theory*, under my recording name of "Cyphernaut."

I took the name of the record from the eponymous book by Manuel DeLanda. Published in 2016, DeLanda's book fuses the work of Gilles Deleuze and Félix Guattari with a new theory of social complexity. Simplified, society is made up of individuals, and even though people come and go, society persists through the grace of interchangeable parts. As seen in the first definition above, society does not function as a whole but is rather a system of harmonious units.

In archaeology, we talk about "assemblages", groups of related, contemporaneous artifacts found together, that when interpreted as a whole are able to convey information, a narrative, or in the case of my music, a song, and a collection of related songs. If I am excavating the contents of a well, I first know the purpose of the well (a built space for water-gathering). I know that things I retrieve from the well were either intentionally deposited or accidentally dropped. The Law of Superposition states that things on top are more recent than things underneath in a given context, so that can help us determine what artifacts go with what from the well, albeit if there was still water in the well when objects ended up there, these artifacts could mingle together, ultimately settling near each other, providing an odd puzzle of artifacts to try to disentangle. Music is like this: we have a general container, which could be either a song or an album or a genre inside of which is a wealth of complex data ranging from time signatures and keys to instrumentations to arrangements, musical modes, and lyrical content.

Working from these two definitions of "assemblage", I set myself some parameters prior to creating my first songs. I had done this before on my *Punk Archaeology* record, limiting myself to a maximum of three hours from a song's inception to its final mix, and limiting myself to three takes for each instrument used on any given song. The result was very raw, very rough, and very Punk. For *Assemblage Theory*, I settled on a style (electronic/intelligent dance music, or EDM/IDM), and limited myself to royalty-free, public domain found-sounds natively recorded in a certain key and beats-per-minute (BPM). These limits served very much as research questions: when you excavate, you can either conduct "total excavation" or you can perhaps use your time and finite resources more wisely by conducting your archaeological investigation based on a set of queries or hypotheses.

Just as an archaeologist doesn't create the context being excavated, I did not play a single note on the "archaeological record." Instead, I discovered artifacts (sounds), piecing them together to create a narrative out of the assemblage of artifacts (songs), at last creating a sequence of assemblages within a site (the album). The challenge was in identifying sounds and then figuring out how they would go together to create something logical (if not listenable). One thing to bear in mind is that these found-sounds were created originally to go with other songs. For my project, I was pulling various sounds from disparate sources to create new songs of my own, thus following the Deleuzeian definition

of "assemblage theory." The sounds are interchangeable but serve the same function as individual building blocks to a cohesive whole of a song.

Some pottery-rich excavations (including two that I have worked on) include pot-menders and conservators who are able to, with great patience and care, piece together sherds—sometimes found meters apart—to create the original vessel. My job as the producer in the studio was to do the same thing with the sounds I'd found, but in this case, taking sherds from many different pots to create an entirely new vessel. The pieces served the same function—to create a pot—and the resulting creation also served the same function as the original vessel (to hold liquid), yet the outcome was wholly outside of the imagination of the pot's original maker. I would love to be able to find the creators of the original sounds I'd found and then play back my song, which uses their creations in an unanticipated way. This is a weird kind of archaeology then, begging the question of whether or not our archaeological interpretations based on found evidence are actually (or partially) correct. Just because we can use artifacts from the same context to tell a logical story does not mean that the story we tell is correct.

In the case of my music, I knew I was making something new based on older material, telling a new story from disparate elements sharing a key and BPM. In hindsight, I created my own assemblages from which I could create new songs as opposed to working with sounds from one song found in some long-abandoned studio, piecing them back together to make something approximating what the original artist intended. What I have made, however, is perhaps reflective of how societies are made if one follows DeLandas' assemblage theory thesis. Societies and their cities are made up of individual, interchangeable components that share similar characteristics yet are also different from one another when viewed at a fine grain. Together this mix of old and young, indigenous and colonist, combine to make their habitable space evolve. New York City, where I work, is always under construction yet is itself very old. New people arrive every day, and the city persists and changes, yet always maintains a distinct New York City feel. When I consider my songs in this context, what I am doing is archaeological, trending more towards an evolution from old to new, combining things in complex, unintended ways, to arrive at something recognizable yet never-before-heard. Perhaps I have stopped being an archaeologist and am instead an archaeological force. The end result of this song, and this

collection of songs, is itself an artifact, and perhaps even a site. Deconstructing it into its individual parts (tracks) can lead back to various sources, a melting pot of sound.

How to Make A Sonic Assemblage

The second song on *Assemblage Theory* is "Daft Valentine", so-named because it features guitars reminiscent of Kevin Shields of My Bloody Valentine, and vocals similar to Daft Punk. To build this song, I found 17 separate, unrelated tracks that were 90bpm in the key of G. I saved them together in a folder and then imported the lot into Audacity, a cross-platform, free-to-use audio software tool that has a very flat learning curve. I decided to limit the song to a maximum of five minutes, and then looped each track to fill that space via copy-paste. This creates a visual block of sound (audio in Audacity appears as waves on a graph, see Fig. 1). Playing all 17 tracks together yielded cacophony, so I listened to pairs of tracks together to discover what sounded good. Following that, I began to "carve" the block of sound like a sculpture, removing parts of tracks here and there until a song emerged, and in some cases deleting tracks entirely as the song took shape. I'm a pop

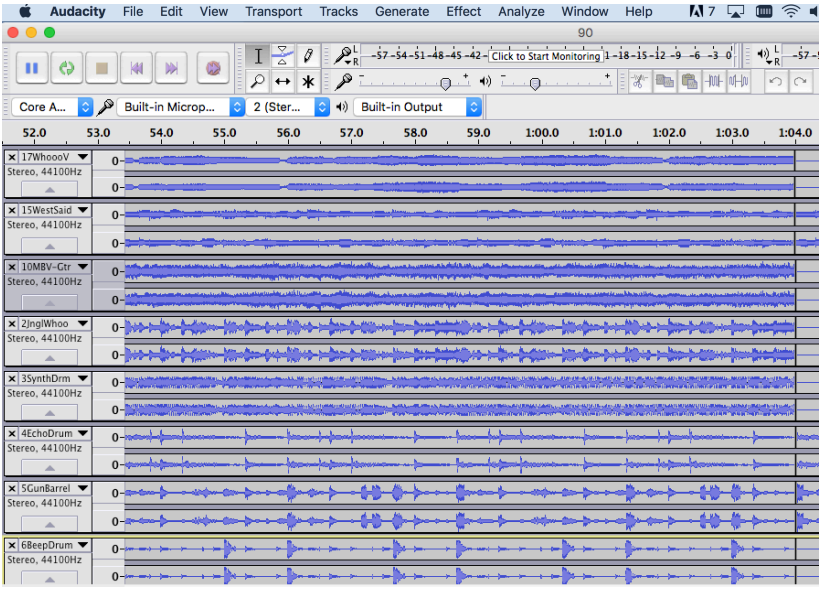


Figure 1, audio in Audacity represented as waves on a graph

traditionalist, so most of the songs I made have an intro, verse, chorus, bridge, and outro, yet they still sound interesting because of the disparate sounds used.

I can guarantee that anyone given the same set of 17 tracks to use over the course of a five-minute song will come up with a different narrative than mine. The individual sounds will be recognizable, but mixed together will create something new and interesting. I have made all 17 of the tracks I used in "Daft Valentine" available here (32 MB ZIP file) should you want to try.

Returning to archaeology for a moment, what we see when we make songs out of the same sound-artifacts is that people can perceive things differently, and can create their own stories out of identical ingredients. Song-making becomes a reflexive exercise, just the same as interpreting data found on a site. When we share that data with others on the team, and with the wider network of people who might be ancillary to the project, we can compare notes and work towards an understanding of what the archaeological record is trying to tell us.

I hope you enjoy *Assemblage Theory* (on Spotify), and I would love to hear your own creations/remixes of "Daft Valentine" should you be intrepid enough to try.

References

DeLanda, *Manuel. Assemblage Theory*. 1 edition, Edinburgh University Press, 2016.

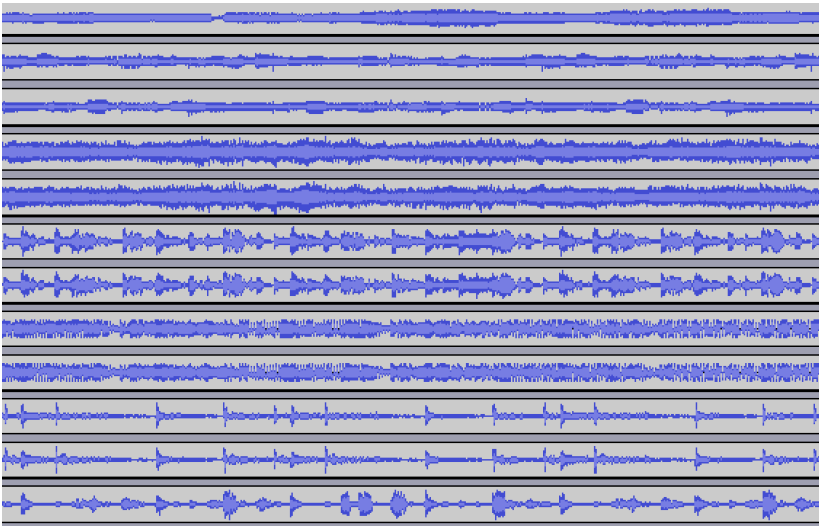
Discography

Reinhard, Andrew. 2019. *Assemblage Theory* (electronic). https://open.spotify.com/album/5kuFeBnBguoqvEgbXEDGIZ?si=-O5a-JOmwRvCD2ZHTJWYGGQ

Reinhard, Andrew. 2016. *Punk Archaeology* (punk/hardcore). http://andrewreinhard.com/punk-archaeology/

Assemblage Theory: Recording the Archaeological Record: First Response

Jolene Smith



Citation:
Smith, Jolene. 2019. "Assemblage Theory: Recording the Archaeological Record:
First Response" *Epoiesen*
http://dx.doi.org/10.22215/epoiesen/2019.5

Jolene Smith is an archaeologist who manages data at the Virginia Department of Historic Resources.
ORCID ID: 0000-0002-0536-1812.

Cover image courtesy of Andrew Reinhard

Introduction

This is a response to Andrew Reinhard's "Assemblage Theory: Recording the Archaeological Record." Reinhard's piece is a playful exploration of what it means to make a "sonic assemblage," and what that assemblage can do. Reinhard collected a variety of freely available sound samples online, assigned himself a time limit, and built an album's worth of songs from the pieces he gathered. Reinhard's result is an attempt at a kind of musique concrète, a montage of sounds.[1] Reinhard's piece seeks to create an album analagous to an archaeological context, where "artifacts could mingle together, ultimately settling near each other, providing an odd puzzle of artifacts to try to disentangle." [2]

How I Approached This Piece

I agreed to respond to this without knowing what it was going to be, but intrigued nonetheless. I thought for a while about how I wanted to approach something like this. I decided I wanted to hear the album, then read the narrative explaining choices, and then listen again. The plan was that coming at it a bit cold would allow me to make connections without being unconsciously swayed by any sort of explanation.

But, I knew that I was listening to an assemblage, sounds made from other sounds. I framed my listening as an archaeologist, attempting to understand an assemblage spatiotemporally. These are the types of questions I considered before experiencing the album:

---

[1] Anon 2019 Musique concrète. Wikipedia. April 16.

[2] Reinhard, Andrew Assemblage Theory: Recording the Archaeological Record. *Epoiesen*. https://epoiesen.library.carleton.ca/2019/02/01/assemblagetheory/, accessed April 6, 2019.

- What can I learn about the creator?
- How can I identify the assemblage's component parts?
- How do the sounds interact to make a song?
- What kinds of interventions or modifications were made by the creator to fit them together?
- How do the songs, understood as archaeological contexts, relate to one another?

Modern Intrusions and Disturbed Contexts

Reinhard shares his album on the Spotify platform, a subscription-based music sharing service. My initial listen resulted in some interpretive challenges. Without a paid membership to the service, the Spotify mobile app randomly shuffles album tracks. Contextual disturbance. Spotify also inserts algorithmically selected songs not on the album. Intrusions. In this case, they seemed to be mass-market dance music. I subsequently learned that the web app will play tracks in order, but the complications introduced by Spotify's shuffles and insertions did seem to reflect often inconvenient archaeological realities. As archaeologists, we often find contexts in a different arrangement than the order in which they were deposited.

The tracks for "Daft Valentine" are provided for download. One of my first attempts at understanding the assemblage through these "artifacts" was to identify the source. I want to understand networks of exchange and connections between data sources contributing to the formation of this sonic assemblage. I attempted to use several automated identification tools such as Shazam (https://www.shazam.com/), but these are designed to identify complete songs.

I made an effort to search for the filenames of the provided individual tracks, with no success. This may indicate that the tracks themselves have been renamed or are themselves derivative objects. They are recordings of recordings, or pieces of some original whole. Vessel fragments. Other sounds seem to be created specifically as building components for use in another song. Designed for reuse. Sonic bricks and nails.

Networks of Exchange and Dispersal

While I wasn't able to find the source of the samples with any of the audio fingerprinting search engines available, I did find something interesting by feeding the Google sound search service the individual tracks: the service identified other songs using the same samples. These all appear to be self-produced electronic, hip hop, and rap songs. Analyzing the "Daft Vox" track returned "Daft Valentine" by Cyphernaut, so, in that sense functionality was verified:

- https://www.amazon.co.uk/Untitled-18-Demo/dp/B07H97DMSK
- How Sway https://play.google.com/music/preview/T3n3wmhoiyiyj6m6nzfyn7aatda?u=0#
- MÃ¥ Jeg by Galsiap Studio, a Norwegian Rap group https://www.youtube.com/watch?v=JcmhPhBAFAU
- Mellow//Soul by Void https://www.amazon.co.uk/Mellow-Soul-Voidproducedit/dp/B06XD6162L

Re-Assemblage

I've taken Reinhard's provided "Daft Valentine" tracks and begun to remix them in Audacity, according to his instructions. My aesthetic instinct is to stretch, bend, and distort the sounds. It's a lot of fun, although I haven't yet produced anything I'd like to share. But the act of chopping up these bits, modifying them and then mashing them (or gently blending them) back together is gratifying and visceral. I've also been thinking of what I might do to collect sounds from an actual, physical archaeological assemblage of artifacts.

Sonic Assemblages Elsewhere

When I first learned of Reinhard's concept, prior to reading his narrative or listening to the album, I thought of two examples of other artists' work with different types of sonic assemblages.

In David Byrne's *Playing the Building*, a series of installations, the artist connected pneumatic mechanisms, percussive parts, and all

Figure 1. David Byrne from https://youtu.be/K6cvCafcPGQ

manner of sound-producing actions from the body of a pipe organ to the pieces of a huge early 20th century building.[3]

Visitors to the installation were invited to "play the building," to engage with its materiality and its new sonic qualities. Adults tended to "play" as one would play a piano, attempting to create sense with chords and harmony. Children, however, would just play. The keys on the organ body weren't actually connected to specific tones, so there was no right or wrong way to play the building. Dissonance and harmony both needed to be explored.

Drew Daniel and M.C. Schmidt, performing as Matmos for 25 years, came immediately to mind when I thought about the sonic assemblage concept. Each of their albums is unified by some theme, and sounds generally come from objects. Their most recent album, Plastic Anniversary, celebrates their musical history and their marriage, while offering a jab at traditional anniversary gift schedules.[4] The sounds on the album are all made by plastic: trash, police riot gear, a giant pill. Their songs are sometimes dissonant, others melodic, and often amusing.

[3] Davidson, Justin 2008 My Building Has Every Convenience. NYMag.com.; Roundhouse 2009 Playing the Building: An installation by David Byrne.

[4] Joyce, Colin, and Noisey Staff 2019 Matmos' New Album Considers the Beauty and Terror of Plastics. *Noisey*. March 22. https://noisey.vice.com/en_us/article/43zebn/matmos-plastic-anniversary-interview, accessed April 6, 2019.

These artists begin with the physical, which is an approach fundamentally different from Reinhard's, but all three experiment with combining, recombining to make a whole that is something entirely different from the sum of its parts.

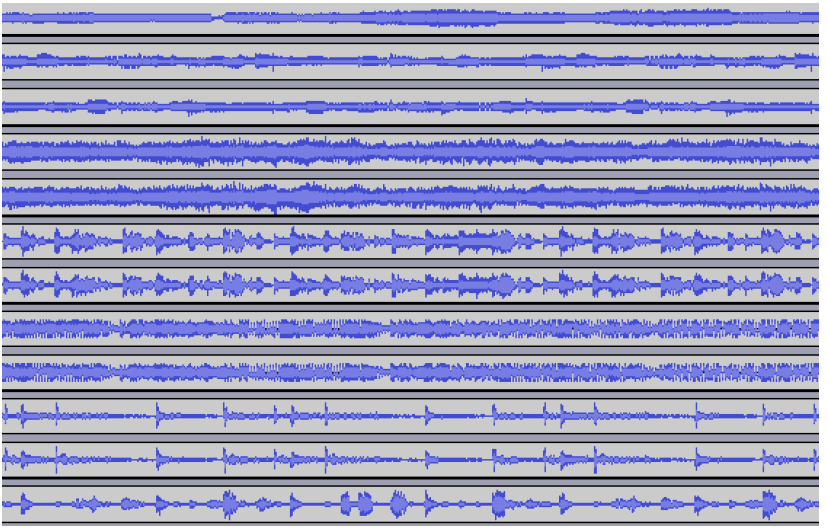
Final Thoughts

Each track, then, is a bricolage. A cache perhaps? A talisman? A hoard? The assemblage(s) embody the behaviors of collection, curation, modification, and creation. Formation processes remain opaque and disentangling them is out of reach. I came away craving to understand the sources of the sounds. In order to think about this piece like I'd think about an archaeological assemblage, I need to be able to understand the artifacts and their formation, their histories.

Since I'm unable to understand the component parts of the assemblage, I'm unsure that the piece necessarily does what it sets out to do: create a new whole and allow for it to be understandable for an archaeological lense. Nevertheless, Reinhard's work here stimulated a lot of thought, experimentation, and engagement with sonic materials, and that was a very good time.

Assemblage Theory: Recording the Archaeological Record: Second Response

William Caraher



Citation:
Caraher, William. 2019. "Assemblage Theory: Recording the Archaeological Record: Second Response" *Epoiesen* http://dx.doi.org/10.22215/epoiesen/2019.10

William Caraher is a historian, archaeologist, and editor at the University of North Dakota. ORCID ID: 0000-0002-4618-5333.

Cover image courtesy of Andrew Reinhard

Responding to Andrew Reinhard's *Assemblage Theory* is difficult on a number of levels. The greatest challenge, for me, is recognizing in Reinhard's work a response to the recent attention to the assemblage in archaeological thinking (Hamilakis and Jones 2017; Harrison 2011; Martin 2013; Fowler 2013; Haggis 2018). This work is remarkably diverse and theoretically informed. Much of it taps into the vital current of thought concerning the limits of material agency both in the past and in our own work as researchers. At its most exciting, critical engagements with the concept of assemblages, relational ontologies, and scientific practices (especially in the hands of thinkers like Karen Barad (2007)) offer new ways for understanding the "social life of things" (Appadurai 1988), "stuff" (Miller 2009), and "vibrant matter" (Bennett 2010). Bruno Latour has explored how in its broadest definition, the concept of the assemblage can inform how we think about our world in the fits of the Anthropocene (Latour 2017). This is heady and important stuff.

At the same time, I was drawn to Reinhard's album and article because of my interest in music. In the past, I've thought about how music can inform archaeological thinking (Caraher 2019; Caraher, Kourelis, and Reinhard 2014). I also just really like music. In fact, as I write these words I'm listening to Ornette Coleman's "Monk and the Nun" which was originally recorded in 1959 during the same session as his iconic *The Shape of Jazz to Come*. "Monk and the Nun" did not appear on that album, and resurfaced only on some compilations released in the 1970s. This afternoon, however, I was listening to it on Ornette Coleman's box set of recordings from his year on the Atlantic label (1959-1961) called *Beauty is a Rare Thing* and released in 1993. The tracks on this box set are arranged in the order that they were recorded rather than in the order that the tracks would appear on any of Coleman's Atlantic albums. This means that they loosely follow the organization of the

albums and do not follow the order of the tracks as they were originally released. Coleman's well-known track "Lonely Woman" is track 5 on the first disc of *Beauty is a Rare Thing* and comes immediately before "Monk and the Nun." It originally appeared as the string first track on his *The Shape of Jazz to Come*. To my mind, this is important: the bass line, then drums, and finally, those magically awkward, melancholic, and deeply engaging lines from Coleman and his long-time collaborator Don Cherry introduce their new approach to jazz featured on this album and definitive for Coleman's long career.

The box set offers an exhaustive survey of Coleman's work during his most exciting and productive period. It is markedly different from the assemblage offered by the six albums released over this same period (*The Shape of Jazz to Come* (1959), *Change of the Century* (1960), *This Is Our Music* (1961), *Free Jazz* (1961), *Ornette!* (1962), and *Ornette on Tenor* (1962)). The different order of the tracks alone give the 1993 box set a different vibe and the faithfulness to the order of recording provides new opportunities for insights into the development of the songs and albums that would make Coleman famous. Reading Reinhard's work reminded me to think about albums as assemblages, and to think (and eventually write) about music.

Reinhard's *Assemblage Theory* is a remarkable experiment in thinking and performing an assemblage. Sculpted from found sounds on the internet, Reinhard's album—and the article that introduced it on *Epoiesen*—makes visible the work of a musician, archaeologist, and individual in bringing order to the fragmented realities that surround us. The seamlessness of Reinhard's beats does not intend to represent or reproduce the cacophonic and discordant character of the original group of samples. Instead, he seeks to resolve their differences through the cutting away and the careful arrangement of the sounds into recognizable songs. Reinhard makes one group of his found sounds available for us to understand his process, and this is a generous way to make clear the methods that Reinhard used, in general, to produce order from the chaos of even his opportunistic assemblages. Reinhard's work reinforces a point made by Rodney Harrison (2011): assemblages are "assembled" rather than discovered and while the act of finding sounds on the internet playfully mimics the modern serendipity of excavation, it does nothing to detract from the obvious work of assembly that is crucial to Reinhard's piece. We can safely assume that he discarded and rejected sounds that were not suitable for his project making the act of finding even less about revealing something that existed and more about creating something that was necessary.

The goal of my response is to explore the nuances of Reinhard's *Assemblage Theory* as he created it and as I have encountered it and to trace the limits of his assemblage beyond the bounds of the album into the sinews of our culture. In this way, I want to emphasize an *Assemblage Theory* as a point of entry into a wider meditation on the ways in which assemblages provide a medium for the critical engagement of our contemporary world. In this way, Reinhard's project reflects his (and my own) longstanding interest in the use of archaeological methods and metaphors as a way of excavating and constructing critical perspectives on the contemporary world.

(I'm now listening to The Comet is Coming's *Complete Studio Recordings 2015CE-2017CE*. The tracks on this album, through some accident of markup lost their metadata and even their original order, when I uploaded this album to my Roon music software library.)

Reinhard is an archaeologist and like so much archaeology, the smoothness of his final production serves as much to obfuscate the original character of his assemblage of samples as the methods and practices that brought them into seemingly meaningful relationships. His description of this process evoked for me Elizabeth Freeman's interpretation of Frankenstein in her book Time Binds: Queer Temporalities, Queer Histories (2010). In a short digression, Freeman considers Mary Shelley's Frankenstein as a model for understanding the role that time played in the processes used to create verisimilitude in media. She argues that in creating his creature, Victor Frankenstein aspired to assemble a being whose seamlessness manifests the experience of reality in the present. His creature, however, was characterized by its seams and sutures that combined the assemblage of scavenged parts necessary to bring it to life. The visible seams demonstrated that it was impossible to eliminate the abrupt and affective character of its pastness that is intrinsic to awkward and profoundly human assemblages. In effect, the seams made Frankenstein's creature authentic and, ironically, alive. Our modern efforts to create a smooth and seamlessness experience from found things, at best, mimics our experiences of the present, but more likely anticipates a perfectible utopian future that disregards our own encounter with the past. The discipline of archaeology with its debt to modernity (Thomas 2006) consistently attempts to create seamlessness from the disparate fragments assembled from past experiences. This echos the modern promise of seamless integration in the internet of things, of augmented and virtual reality, and in various transhuman fantasies of technologically enhanced humans.

Reinhard's selective remixing of his samples to produce a smoothly contoured present ensured|created a juxtaposition that both located the samples in the past but also created their pastness. The dissonant, discontinuous, and found character of the samples defined them as something other than the contemporary experience. This distancing made the act of re-assembly possible and, indeed, necessary even through we realize that the digital samples at the core of Reinhard's songs are from an archaeological strata that could also be contemporary with the songs themselves. As Smith has noted in her response to this album (2019), Reinhard's effort to assert and demonstrate the disparate parts of these songs while simultaneously obscuring how these parts fit together to create a sonically consistent whole is a key role in locating Reinhard's creative power in the present. The tension between an asserted pastness and recognizable present is a common feature of our diverse, digital, post-industrial and modern world in that we often seek to eliminate the jarring disjunctions between parts of the assemblage that remind us of the past's messy abruptness. The tragic and all-too-human character of Victor Frankenstein's monster made it the deeply sympathetic victim of modernity's distain for the incongruity and flawed character of the past and the false hope for a seamless and perfected future.

To his credit, Reinhard, like Victor Frankenstein, is honest about how he created his assemblage. He arranged his found sounds according to the structure of traditional pop songs and accentuated the sounds that evoked contemporary guitar rock, beats drawn from trap, house, and EDM, as well as other sonic conventions. These various structures are part of this assemblage as well, and it is probably safe to assume that these structures allowed Reinhard to prefigure his album in the sounds on the internet. Hayden White (1973), for example, famously argued that a series of tropes and forms of employment shaped the way that historians produced narratives, explained causality, and produced assemblages of evidence. Neville Morley's (2019) response to Reinhard's piece reminded us that pop sensibilities are only one potential way to emplot this assemblage. As long as pop music has existed, there have been those who have sought to challenge the self-evident character of its structure.

(I just put on the Minutemen's *Double Nickels on the Dime* which was famously recorded and mixed for $1100 (Azzerad 2001, 82).

Despite the effort to make this into a concept album, it still retains the band's anti-commercial, rambling style of the band which was the very antithesis of pop music.)

Despite Morley's critique, which Reinhard invited by making his original assemblage available for examination, Reinhard's arrangement still models our own approach to archaeological knowledge making. Narratives of all sorts prefigure the assemblages that we encounter in archaeology. These narratives and processes constitute parts of these assemblages the same way that a traditional pop melody or familiar sound on the web prefigured the songs possible at Reinhard's deft hands. Different hands introduce different elements to the assemblage and Reinhard's generosity with his samples has resulted in at least one new encounter with some of the same basic elements.

There are other elements present in Reinhard's assemblage that offer more insights into the process that produced the final album. Two struck me as immediately visible.

First, the album has the unmistakable character of contemporary music making in its unfailing and precise rhythmic structure. Generally, a "click track" imparts this structure on a song. The click track is a tool that allows a musician to precisely synchronize sounds in various recordings. The click track is eliminated during the production process, but the regularity of the beat that it imparts persists. Damon Krukowski (2019), the former Galaxie 500 drummer, has recently observed that the "click track" regularizes the interplay between musicians in recordings. Prior to the use of click tracks and in live performances, musicians would listen to one another and adjust their tempos in minute ways that would allow a song to hold together. Musicians also would be influenced by live audiences to accelerate or slow their tempo in response to the crowd, the moment, and the shared experience of the performance. Thus the audience and performers responded to one another and the listener's response to a performer would follow the performers responses to one another in the process of music making.

I'm now listening to Cannonball Adderley's album *Something Else* (1958) and as I bob my head in time to their version of the jazz standard "Autumn Leaves" waiting for the entry of Miles Davis's muted trumpet, I'm literally moving in sync with the musicians as they listened to each other. I'm locked into the interplay between Art Blakey's drums, Sam Jones's bass line, and Hank Jones's sparse piano. These are real musicians whose subtle cues and gestures I attempt to imagine as I listen

deeply into this classic album. Reinhard's album is a different affair, but it would be an odd effort to seek human interaction in the mechanical regularity of the click. Krukowski has suggested that lack of intimacy in contemporary recorded pop music comes from the standard use of the click track which has eliminated the subtle variations that may be undetectable on a conscious level, but nevertheless draw us into the experience of music as a human art. Whether one agrees with the argument of a former dummer is less significant than the more obvious observation that when we move our body in time with Reinhard's thumping beats, we are not sharing in the generative interplay of the musicians who recorded the song, but falling in sync with precise beats of a machine.

The other artifact of Reinhard's assemblage that captured my attention was the driving beat of trap music. Over the last decade, the rhythms of trap have become essentially synonymous with hiphop. Trap is usually associated with the beats that emerged in the South, and particularly Atlanta, in the 1990s and by the early 21st century these beats became increasingly common in the EDM. Essential to the style of trap is the sound of the Roland TR-808 drum machine which became so closely associated with this style of music that hiphop duo Outkast recognized it by name in their 2003 hit "The Way You Move" which connects the 808s distinctive cymbal and bass that is characteristic of trap.

> So click-it or ticket, let's see your seat belt fastened
> Trunk rattlin', like two midgets in the back seat wrestlin'
> Speaker box vibrate the tag
> Make it sound like aluminum cans in a bag
> But I know y'all wanted that 808 Can you feel that be-A-S-S, bass

Outkast here is making fun of the 808-produced trap so typical in early-21st-century Atlanta hiphop by describing how it sounds played through a car stereo with its powerful subwoofer rattling the license plate and the poorly attached plastic trim. The reference to it sounding like "aluminum cans in a bag" is not simply an innocent simile but a playful suggestion that the sound of thumping base evokes the image of the urban scavenger with his assemblage of recyclable cans in plastic trash bag. In the hands of Outkast, the ubiquitous sound of trap and the Roland TR-808 slyly evokes the lower class near-suburbs of Atlanta

and the "dirty" neighborhoods which made this sound famous. This superficial reading of trap does not do the complexities of this genre justice (see for example, McCarthy ([2018](https://nplusonemag.com/issue-32/essays/notes-on-trap/))), but since Reinhard's album is not so much trap as trap-inspired EDM, the relationship between his beats and the assemblage of trap driven hiphop is probably distant enough for us to abandon it at this point in my response.

The more proximate context for trap inspired EDM is, of course, the club. As I have already noted in my discussion of the "click track" in contemporary electronic music, the use of trap beats in the club creates a bodily response not just to the beats, but to the automated processes which order the beats into a systematic tempo. The club is also a place of consumption and display where music is not only consumed, but individuals produce distinctive assemblages to manufacture both group and individual identities. EDM is social music designed to be played in public places and a constituent part of the assemblages that define club culture identity (classically explored by D. Hebdige (1979); more recently Jackson (2004); Wilson (2006)).

The intersection of style, music, and the movements of bodies in the club locates Reinhard's album amid a larger assemblage of manufactured experiences that define identities within consumer culture. A particularly intriguing aspect of our experience with *Assemblage Theory* is the loudness of the album. Loudness in this context does not refer to the volume of the tracks which the user can control, but the relationship between the quietest and loudest passages on any track. The compressed dynamic range of the tracks on *Assemblage Theory* is a sonic artifact of the late-20th and early-21st century. Reinhard's album has a dynamic range of around 6 db, which is consistent with the 6 db of range present on Migos platinum-certified album *CULTURE* and slightly less dynamic than Daft Punk's 10 db range on *Random Access Memories*. To put this in perspective Orbital's highly regarded second album (often called "The Brown Album") released in 1993 had a dynamic range of 13 db. A Tribe Called Quest's iconic *Low End Theory* from 1991 had a range of over 12 db. The recent increase in loudness has its roots both in the desire of record labels to have songs that stand out on the radio, but it also ensures that tracks sound hyperreal when played through highly amplified sound systems at dance clubs. The flattening of dynamic range ensures that all frequencies and passages are equally audible above the throbbing bodies of a dance club. On

home systems, particularly low efficiency speakers and headphones, this loudness creates an impression of fidelity that has little in common with the sound of live instruments. In many ways, the loudness of EDM contributes to hyperreality of the genre (and increasingly of all pop music) that has no or few referents in performed music. Our encounter, then, with loudness, the regimented experience of the click track, and the seamless integration of the found sounds in the assemblage offers an experience of the real with only the barest of relationships with our lived experiences. To use Baudrillard's language, the structuring of this assemblage offers a simulacrum that lacks a clear point of reference (Baudrillard 1994).

Reinhard is aware that his assemblage is hyperreal and makes the samples of a track available for us to play along with him and to create our own music from a common pool of sonic artifacts. It is worth noting that in archaeology, this kind of generosity remains relatively rare. Historically, archaeologists were loath to release key elements of archaeological assemblages often preserved in excavation notebooks which often remain the personal property of the scholar. More recently, archaeologists have acknowledged that their deep experience in the landscape, with particular methods, and across the social relationships that shape fieldwork formed as vital a part of the archaeological assemblage as the carefully documented ceramic sherds and stratigraphic relationships. These limits, of course, shape Reinhard's willingness to share as well. He is not only adept at manipulating the tracks in Audacity, but also has a workflow, a distinct set of gear, and experience as a musician to guide his encounter with these songs. Recognizing this, I was at first, inclined to critique Reinhard for only releasing the artifacts from one song and to note that it neatly paralleled the tendency among archaeologists to feint toward transparency and openness in analysis while holding back certain key elements of the interpretative process. This was uncharitable, though, because by offering one song from *Assemblage Theory*, he pushes us from thinking about the artifacts present in the songs and toward thinking about the broader assemblage of artifacts that served to mediate our encounter with his music. Our own efforts to manipulate the provided tracks primarily demonstrate the impossibility of recreating Reinhard's songs.

Even the more passive encounter of just listening to Reinhard's album is fraught with a certain element of uncertainty. When I first read Reinhard's piece, I clicked through to Spotify and dutifully clicked on the first track. The website played the first 30 seconds of the song and then went to the next song on the album. I didn't think much of it because I wasn't really that concerned with the length of the songs. After two or three tracks, however, I discovered that because I don't have a Spotify account, I could only hear the first 30 second of each song. That was a bummer, and apparently this also influenced the first responder to this article's listening to the tracks (Smith 2018).

I then emailed Reinhard and he let me know that the album was also available on Tidal. I then played it on my MacBook Pro and thought it sounded interesting enough to cue it up on the stereo that lives in my main room. Through my much larger and more sophisticated stereo the sound seemed a bit muddled: the big bass in a few songs (like "Trappist") seemed to smear across the other sounds on the track, and the lack of dynamic range made the entire album just feel too loud and heavy. To be clear, the system that I was using to play the album was not optimized for loud music. I was streaming the album over an Auralic Mini music streamer that outputs to a Schiit Bifrost DAC from which it then runs through a pair of Audioquest RCA cables into a 60 watt vacuum-tube Audio Research Corporation amplifier that drives a pair of Zu Omen Defs speakers. The Omen Defs are paper-cone, full-range-driver speakers that I've paired with two super quick, 400 watt Zu Undertone subwoofers. This system loves dynamic music: small ensemble jazz, carefully recorded rock music, and acoustic stuff. When I play loud, boomy music especially through the streamer, the bass makes the entire scene a bit sloppy for some reason.

The next day, I also played it over my little office system which consists of two powered Yamaha studio monitors and a thumpy little subwoofer that sits under my desk. It sounded tighter and every bit as loud as on my home system, but not as big and more precisely rendered. This little system encouraged me to look deeply into the mix as one might expect from studio monitors.

Finally, I returned home and played the version of the album that Reinhard sent to me as .wav files through my Sony music player (a HAP-Z1ES) and from there into my ARC amplifier and into my big speakers. For some reason this cleared up most of the boomy-ness. It was still loud, but it felt a bit more carefully wrought and exact. This version of

the album preserved more of the digital character of the music despite it running through vacuum-tube amplifier and paper cone speakers. At the same time, it communicated a sense of scale. 800 watts of subwoofer and four paper-cone woofers ensured that I felt the music.

All of this is to point out that this sculpted assemblage of samples also consists of a complex series of technologies, services, and environments that mediate our encounter with all parts of the assemblage from their transmission to the relationship between the various component parts. The more that I listened to his album (and right now, I'm listening to it on my MacBook Pro, through an Audioquest Dragonfly Red DAC, a ALO Rx MC3-B+ headphone amplifier and a pair of Audeze LCD-2C headphones), the more I wondered how close what I was hearing was to what Reinhard created. My various listening environments created plenty of room to quibble about how the assemblage actually works.

What remains clear in all of my encounters with Reinhard's assemblage, however, is how companies have succeeded at monetizing various elements in this assemblage. Sometimes this is overt, such as when we have to sign up to listen to a particular music service which then records our listening habits, compensates (barely) musicians, and serves up advertising. At present, we only have access to this music through a series of music services that monetize Reinhard's efforts and whose future is far from certain. The formats through which this music is distributed---whether in the uncompressed format of a .wav file or through such compressed formats as FLAC, ALAC, or MP3---may prove as ephemeral as 8-track tapes, DATs, or mini discs, or as persistent as LPs. Archiving these tracks so that both Reinhard's and this article makes sense in the future is not as simple as saving the music files to a repository, but must also extend to preserving the various subsidiary formats and even devices through which these songs could be heard. As Raiford Guin's (2014) work has shown with video games, digital artifacts are more than just the source code, but involves the experience of the arcade or the home gaming system, the haptics of the controllers, the look of the CRT monitor or television, and even the art on the game cartridge or cabinet.

(I'm now listening to Paul Westerbergs ill-fated 2008 album *49:00*. The album is a brilliant piece which blurs the distinction between a medley, montage, and album, but since it included covers of songs

by the Rolling Stones, the Beatles, Alice Cooper, Steppenwolf, Bob Dylan, and others, and these covers were not cleared, the album was pulled from various online stores within days. You can now hear it on Soundcloud.)

Reinhard is aware of the commercial concerns associated with the dissemination, use, and reuse of audio and their place within the longer history of music making. The samples that Reinhard used in his songs were all free and open access, apparently, and this, presumably, was an economic and political decision, but also an artistic one. Thirty years ago, however, the landscape of sampling and the assemblages available to recombine look much different. Hanif Abdurraqib, in his recent meditation on the oeuvre of A Tribe Called Quest, Go Ahead in the Rain: Notes to A Tribe Called Quest, (2019) reflected on the change in hiphop in the mid-1990s when record labels discovered they could require permission and payment for samples used in songs. By 2001, the use of expensive samples becomes a point of pride for some rappers and embarrassment for others. Jay-Z, famously attacked Nas by claiming that he did not even own the right to his own songs so when Jay-Z sampled them, Nas did not make any money (this point was later disputed by Nas and his representatives):

> So yeah, I sampled your voice, you was usin' it wrong
> You made it a hot line, I made it a hot song
> And you ain't get a coin, nigga, you was gettin' fucked then
> I know who I paid, God "Serchlite publishin'"

In this context, Reinhard's use of free samples explicitly detached himself from one of the commercial aspects of the music making process. At the same time, he did not release his entire assemblage of samples explicitly and, curiously, there is no equivalent of the ceramic catalogue, or concordance where he credited the original sources of his samples. Moreover, he distributed his music via commercial services that even at the free tier require registration as a way to monetize plays and listeners, and his tracks are not available for free download. We can imagine, then, that maybe Reinhard is getting "coin," but his sources are, in Jay-Z's words, "gettin' fucked." In the 21st-century, moreover, it is clear that as listeners, we are, like his samples, also a resource to be monetized.

This is not meant to be a criticism of Reinhard's place in the media ecosystem or his right as an artist to benefit however modestly from his work, but to demonstrate how the flow of objects through various media create relationships and value. Recent attention to media in the production of archaeological knowledge (Garstki 2018; Morgan and Wright 2018) and in its presentation and reception (Perry 2018; 2019) has revealed the complexity of the relational systems that shape how sites, artifacts, and encounters create opportunities for ethical actions and shared knowledge. The easy fluidity of digital space perhaps emphasizes or even exaggerates the instability of the kinds of 21st-century assemblages accessed through *Assemblage Theory*. The interplay of the physical and virtual continuously destabilize how our experiences of digital worlds produce meaning. In this way, *Assemblage Theory* is a valuable companion to Reinhard's longterm project of archaeogaming (Reinhard 2017). It also reminds us that the relationships that constitute knowledge---even in the dusty corridors of Ivory Tower archaeology---are always being monetized through access, citation, reading, and remembering.

Reinhard starts his discussion of assemblages with Manuel Delanda's *Assemblage Theory*. By the time I had finished listening to *Assemblage Theory* for the third or fourth time, I was more drawn to considering his work in light of Delanda's earlier text, *War in the Age of Intelligent Machines* (2003). In this book, Delanda expanded and developed the notion of machinic phylum (DeLanda 1997) from Deleuze and Guattari's *Thousand Plateaus* (1987). Deleuze and Guattari emphasizes that assemblages form not merely through conscious decisions or even discursive rules (like narratives or the pop song), but also through affordances of the objects themselves. These scholars were particular intrigued by the notion of flow and the ways in which the movement of material, manufactured objects, and individuals mediated by their materiality produced value within the capitalist system in ways that appeared to be nearly autonomous. Michael Roller has adapted this notion of archaeological assemblage as evidence for the emergence of mechinic consumerism in the 20th century (Roller 2019). This is a kind of consumerism that is as much a product of producers and production as the manufactured objects. Roller reminds us that the assemblages that reproduce the experiences of 20th- and 21st-century consumer culture are fraught with contradictions and map onto our experiences

as both producers and consumers. The tolerance for these contradictions both within assemblage and within our lived experience reflects the growing willingness to accept "the intervention of corporations in their lives" (18) and an opportunity (if not obligation) for archaeologists to untangle the complexities of 21st-century assemblages and unpacks "the plurality of forces that produce the present world" (19). It is worth noting that despite Roller's radical and activist rhetoric, his article appears in the journal *Historical Archaeology* which is published by the commercial publishing conglomerate Springer Nature who monetized access to his radical arguments.

An archaeological investigation of Reinhard's *Assemblage Theory* goes beyond the playful parataxis of distinct samples and sounds and reveals traces left behind by the technological, political, economic, intellectual, and social flows that establish value and define culture in our contemporary world. Haggis has argued that the assemblages of ceramic objects and sculpture excavated from a Hellenistic pit at Vergina or a Late Archaic well in Athens (Haggis 2018) constitute a context for considering archaeological questions that arise at the intersection of methods and the functional, chronological, and typological relationship between objects, space, and place. Isolating these objects from their archaeological context through their display in a museum or appearance in a catalogue, for example, transforms (and some would argue even impoverishes) the potential value of these objects to speak to the widest range of questions about past practices that form the basis for larger statements on past culture. By locating Reinhard's *Assemblage Theory* in a series of different contexts, we open it up to speak most broadly to questions of pressing concern in contemporary society.

I hope my response has shown how our encounter with this album traces a number of elements of 21st century economic and social life. First and foremost, the album celebrates the potential of art gleaned from the surplus sounds scattered about the internet. The growing fascination with modern spolia (Meier 2012), the surplus of material and meaning that surrounds contemporary life (Akasegawa 2009), and the economic and creative activity of scavengers (Ferrell 2006) speaks to a society increasingly defined by the reciprocal acts of production and consumption.

Reinhard's trap-inspired EDM relentlessly encourages us to connect our movements to his music through a tempo encoded in an invisible "click track" and to embody the precise pulses of our digitally mediated

world. In some, indistinct ways, this prepares us for the hyperreal loudness of *Assemblage Theory*. The vividness and immediacy of the album seems to anticipate its seamless distribution through commodified, ubiquitous, and increasingly invasive services. The same connections that both allowed Reinhard to harvest found sounds and us to enjoy his creative work creates value for capitalistic concerns who profit from the flow of data throughout our connected world. At my house, *Assemblage Theory* was further mediated through an arcane and expensive set of stereo equipment. In my most optimistic moments, I pretend that the carefully arrangement of components in my stereo system creates a unique sound through which I can assert some individuality. In reality, I am probably the same as a club kid whose body sways to a hidden click track while pretending that the latest styles make me distinct enough to stand out and recognizable enough to be part of a crowd.

References

Abdurraqib, H. (2019). *Go Ahead in the Rain: Notes to A Tribe Called Quest*. Austin: University of Texas Press.

Appadurai, A., (Ed.). (1986). *The Social life of things: Commodities in cultural perspective*. Cambridge: Cambridge University Press.

Akasegawa, G. (2009). (Trans. by M. Fargo). *Hyperart: Thomasson*. New York City: Kaya Press.

Azerrad, M. (2001). *Our Band Could be Your Life: Scenes from the American indie underground 1981-1991*. Boston: Little, Brown.

Barad, K. M. (2007). *Meeting the Universe Halfway: Quantum physics and the entanglement of matter and meaning*. Durham: Duke University Press.

Baudrillard, J. (1994). *Simulacra and Simulation*. Ann Arbor: Univ. of Michigan Press.

Bennett, J. (2010). *Vibrant Matter: A political ecology of things*. Durham: Duke University Press.

Caraher, W. R., Kourelis, K., Reinhard, A. D., (Eds.). (2014). *Punk Archaeology*. Grand Forks, ND: The Digital Press at the University of North Dakota.

Caraher, W. (2019). Slow Archaeology, Punk Archaeology, and the 'Archaeology of Care'. *European Journal of Archaeology*, 22(3), 372-385. doi: https://doi.org/10.1017/eaa.2019.15

DeLanda, M. (1997). Mechinic Phylum: Essay by Manuel de Landa for "TechnoMorphica" (1997). *V2_*. https://v2.nl/archive/articles/the-machinic-phylum

DeLanda, M. (2003). *War in the Age of Intelligent Machines*. New York, NY: Zone Books

DeLanda, M. (2016). *Assemblage Theory*. Edinburgh: Edinburgh University Press.

Deleuze, G., and Guattari, F. (Trans. by B. Massumi). (1987). *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minneapolis Press.

Ferrell, J. (2006). *Empire of Scrounge: Inside the urban underground of dumpster diving, trash picking, and street scavenging*. New York: New York University Press.

Fowler, C. (2013). *The Emergent Past: A Relational Realist Archaeology of Early Bronze Age Mortuary Practices*. Oxford: Oxford University Press.

Freeman, E. (2010). *Time Binds: Queer Temporalities, Queer Histories*. Durham, NC: Duke University Press.

Garstki, K. (2017). Virtual Representation: The Production of 3D Digital Artifacts. *Journal of Archaeological Method and Theory*, 24, 726-750. doi: https://doi.org/10.1007/s10816-016-9285-z

Guins, R. (2014). *Game After: A cultural study of video game afterlife*. Cambridge, Massachusetts: MIT Press.

Haggis, D. (2018). Discussion and Debate: In Defense of a Contextual Classical Archaeology. *Journal of Mediterranean Archaeology*, 31(1), 101-119. doi: https://doi.org/10.1558/jma.36812

Hamilakis, Y., and Jones, A. (2017). Archaeology and Assemblage. *Cambridge Archaeological Journal*, 27(1), 77-84. doi: https://doi.org/10.1017/S0959774316000688

Harrison, R. (2011). Surface Assemblages. Towards an archaeology in and of the present. *Archaeological Dialogues*, 18(2), 141-161. doi: https://doi.org/10.1017/S1380203811000195

Hebdige, D. (1979). *Subculture: The meaning of style*. London: Methuen.

Jackson, P. (2004). *Inside clubbing: Sensual experiments in the art of being human*. Oxford: Berg.

Krukowski, D. (2019). *Ways of Hearing*. Cambridge, MA: The MIT Press.

Latour, B. (2017). F*acing Gaia: Eight lectures on the new climate regime*. Cambridge: Polity.

Martin, A. M. (2013). *Archaeology beyond Postmodernity: A science of the social*. Lanham, MD: AltaMira Press.

McCarthy, J. (2018). Notes on Trap: A World Where Everything is always Dripping. *N+1*. 32. https://nplusonemag.com/issue-32/essays/notes-on-trap/

Meier, H.-R. (2011). Spolia in Contemporary Architecture: Searching for Ornament and Place, in Richard Brilliant and Dale Kinney (Eds.), *Reuse, Value, Erasure: Critical views on spolia and appropriation in art and architecture*. Farnham: Ashgate. 223--236.

Miller, D. (2010). *Stuff*. Cambridge: Polity Press.

Morgan C. & Wright, H. (2018). Pencils and Pixels: Drawing and Digital Media in Archaeological Field Recording, *Journal of Field Archaeology*, 43(2), 136-151. Doi: https://doi.org/10.1080/00934690.2018.1428488

Morley, N. (2019). Fables of Reconstruction. *Sphinx Blog*. February 9, 2019. https://web.archive.org/web/20190209190550/https://thesphinxblog.com/2019/02/09/fables-of-the-reconstruction-2/

Perry, S. (2018). Why Are Heritage Interpreters Voiceless at the Trowel's Edge? A Plea for Rewriting the Archaeological Workflow. *Advances in Archaeological Practice*, 6(3), 212-227. doi: https://doi.org/10.1017/aap.2018.21

Perry, S. (2019). The Enchantment of the Archaeological Record. *European Journal of Archaeology*, 22(3), 354-371. doi: https://doi.org/10.1017/eaa.2019.24

Reinhard, A. (2018). *Archaeogaming: An introduction to archaeology in and of video games*. New York: Berghahn Books.

Roller, M.P. (2019). The Archaeology of Machinic Consumerism: The Logistics of the Factory Floor in Everyday Life. *Historical Archaeology*, 53(3), 3-24 .doi: https://doi.org/10.1007/s41636-018-0149-0

Smith, J. (2019). "Assemblage Theory: Recording the Archaeological Record: First Response" *Epoiesen* doi: http://dx.doi.org/10.22215/epoiesen/2019.5

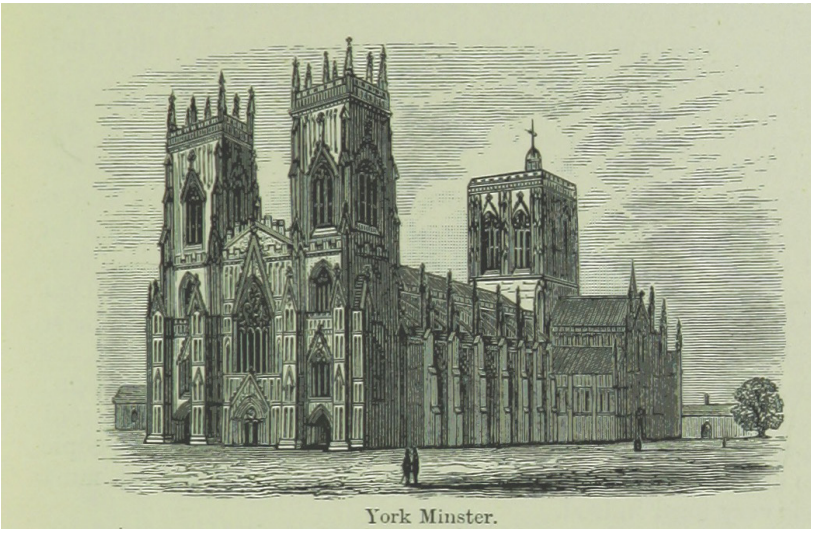
Thomas, J. (2006). *Archaeology and Modernity*. London: Routledge.

White, H. (1973). *Metahistory: The historical imagination in nineteenth-century Europe*. Baltimore: Johns Hopkins University Press.

Wilson, B. (2006). *Fight, Flight, or Chill: Subcultures, youth and rave into the twenty-first century*. Montreal: McGill-Queen's University Press.

Visualizing the York Minster as Papercraft

Alyssa Loyless



Citation:
Loyless, Alyssa. 2019. "Visualizing the York Minster as Papercraft" *Epoiesen*
http://dx.doi.org/10.22215/epoiesen/2019.3

Alyssa Loyless is an MSc student in Archaeological Information Systems at the University of York. ORCID: 0000-0001-8360-8684

Cover Image:
"Bulley, Eleanor. 'Great Britain for Little Britons. A book for children' p45."
British Library Flickr: https://www.flickr.com/photos/britishlibrary/11081935765

The use of paper as a mechanism for visualization is an ancient art form, making it a fitting medium for the display of heritage monuments and historic materials. Papercraft is an artform that employs paper or card as the primary medium for the construction of three-dimensional objects. It is a method of visualization that requires the creator to analyze and study a resource in great depth, and with technology of the 21st century it is possible to plan, build, and even imagine these models within the space of virtual reality. This paper outlines the process for creating a papercraft model of the York Minster beginning with the digitisation of the structure in Adobe Illustrator and ending with its reconstruction in paper format. Additionally, the potential for future enhancement of the model through digital means will be discussed.

Heritage papercraft models that are generally distributed to the public for download involve downloading relatively simplified templates that are then cut and glued together (see Ellwood 2018; SEAArch 2007). The process for visualizing a heritage resource as papercraft requires a significant amount of close analysis and artistic interpretation. Even the simplest of papercraft models require that the creator view the subject in great detail in order to note the distinct shapes, curves, and details of the resource. Those details then have to be adapted to paper format and made possible for reconstruction. Subsequently, any individual who takes on the challenge of creating a second-hand papercraft adopts this educational component as they fit the pieces together.

The approach for this project was to give an opportunity for varying levels of difficulty to be incorporated into the building of the model, while also leaving the color scheme as a blank canvas for the possibility of incorporating projection technologies in the future. This blank canvas also allows for a coloring element to be applied by other users. The York Minster was chosen as the topic for reconstruction because it exhibits extreme detail in its negative spaces including windows,

doorways, and roof extremities, while also representing a central location to the city of York that is easily recognisable. The Minster is a heritage monument that was first constructed around 627 AD, and reconstructed in its present Gothic-style between 1220 and 1472 (History of York, n.d.).

The vision for the end product of this papercraft model was to be able to showcase the windows using a central light source within the model. Therefore, it was decided that the best approach to achieve this visualization would be to focus efforts of design and detail on the larger windows.

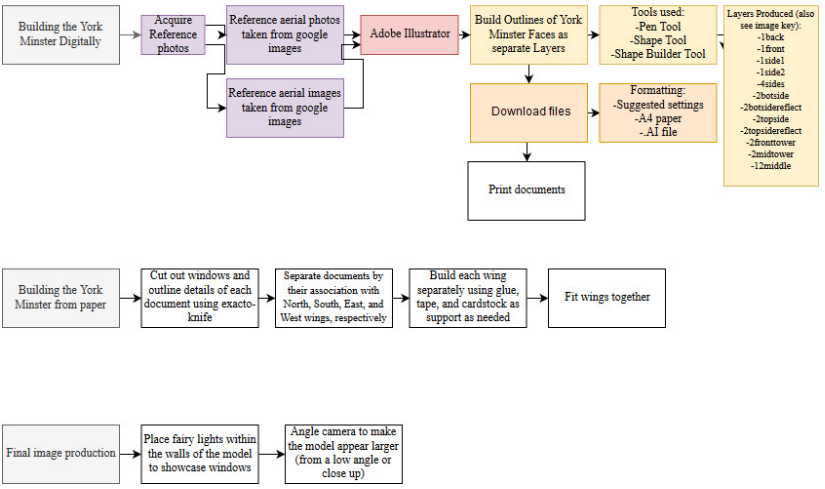


Figure 1. Model Workflow.

Methodology

The methodology for the production of this project involved three stages:

a) data acquisition and modelling in Adobe Illustrator,
b) printing, cutting and building, and
c) final image production.

This process can be seen in the model workflow above (Figure 1). 'Data' in this instance refers to the reference photos used to create the model within Adobe Illustrator. These photos were personally taken

for each face of the Minster from the ground and from the tower. Additionally, aerial photos were sourced through google imagery to supplement for any areas that were not visible in the collected imagery.

Adobe Illustrator was chosen to make the templates for the paper cutouts because of the programs ability to construct and merge together basic shapes on top of a pre-established A4 page layout. The tools used within Adobe Illustrator were the pen tool, shape builder tool, and rectangle/ellipse tool. Each face of the Minster was constructed on a separate layer with its own distinct color, and each layer was toggled on and off to ensure consistency in scale (Figure 3). Scale was first established through the modelling of the West-facing entrance of the York Minster. Because the roofing detail on the face of the entrance has the tallest point of the structure, it was used to fill the vertical extent of the page. Altogether, twelve separate layers were constructed for the model. These are listed in the workflow under "Layers Produced," and the faces that they represent are visualized in the Figure 2 Image Key.

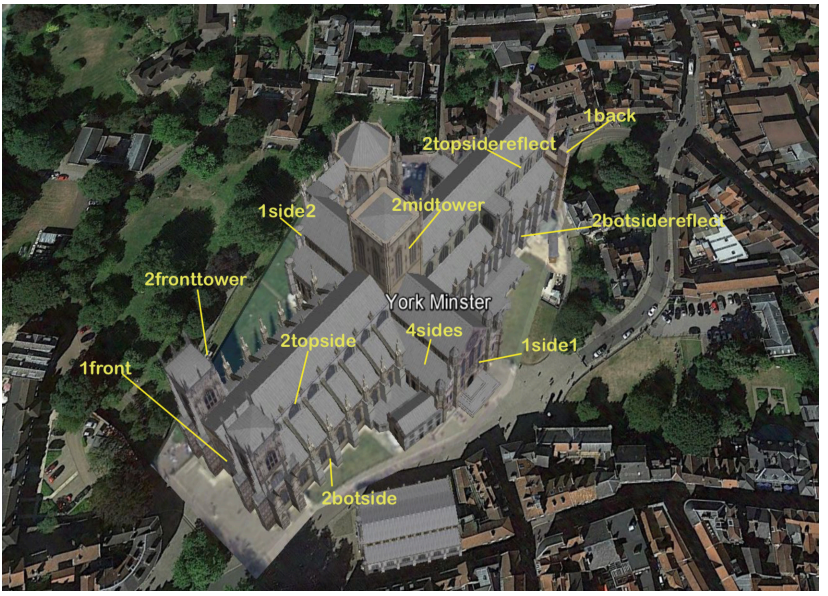


Figure 2. Image Key for Flow Chart. Base Image Courtesy Google Earth.

For planning purposes and any potential future distribution of the project, the layer files were labelled based on the number of copies required for printing. For example, "2fronttower.ai" would require two copies and "4sides.ai" would require four copies. The layers are made

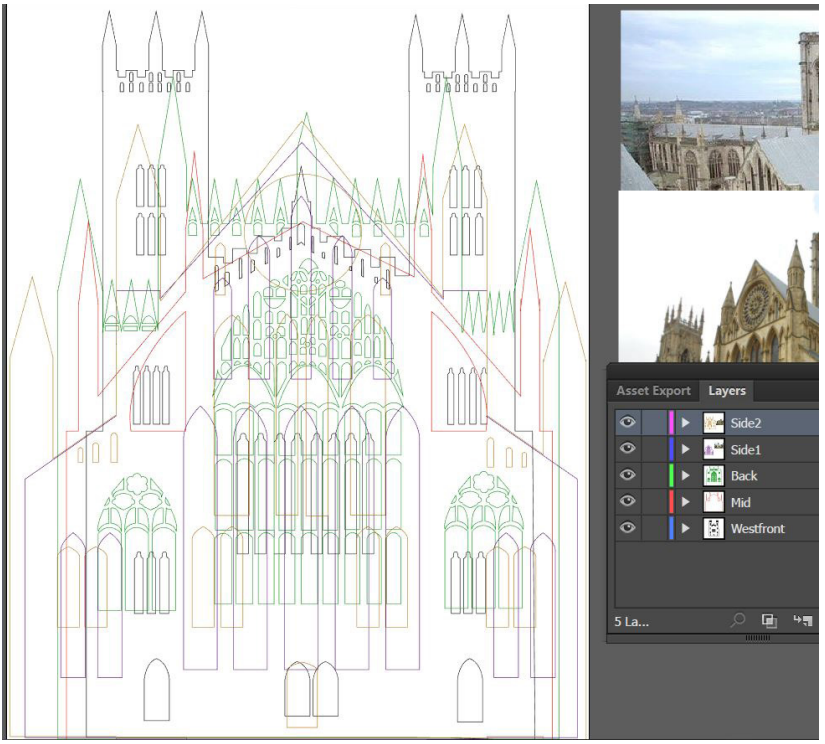


Figure 3. Progress screenshot showing the distinguished layers during the construction of the model in Adobe Illustrator.

publicly available from a downloadable Google documents folder which can be accessed here: https://epoiesen.github.io/artefacts/yorkminster-papercraft/.

Templates were purposefully saved as .AI files, rather than .pdf, so that editing could be enabled if necessary.

Once the layers were completed, they were printed onto A4 printer paper and then prepared for cutting. The template outlines can be viewed in figures 4 and 5. The tools used during the cutting and building process were a cutting board and an exacto-knife. This process of cutting the entire model took about 8 hours to complete in one sitting and in order to save time some of the curved details were reduced to straight cuts.

The building of the model required consistent reference to photos of the Minster, in addition to card stock supports for the thin A4 paper. To combat time constraints, it was decided that the most detailed pieces

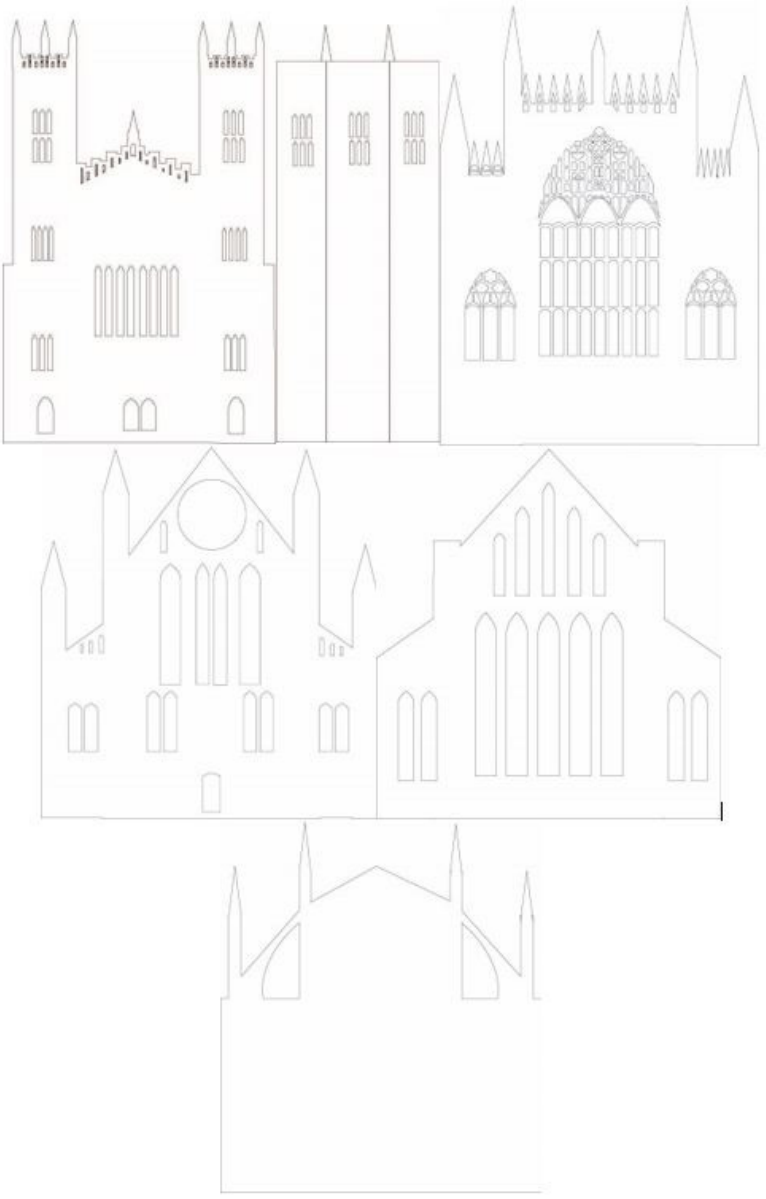


Figure 4. Left to right: 1front, 2fronttower, 1back, 1side1, 1side2, 12middle.

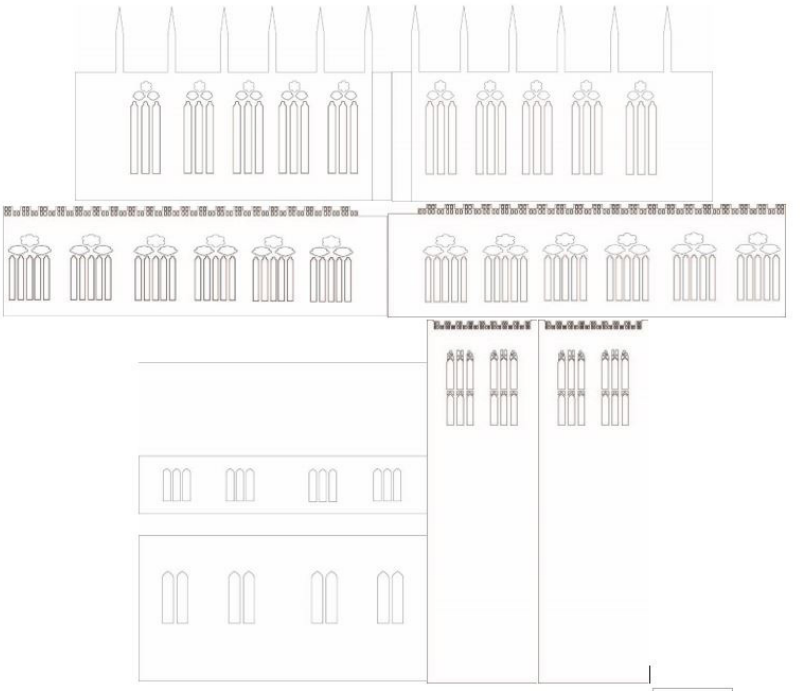


Figure 5. Left to right: 2botside, 2botsidereflect, 2topside, 2topsidereflect, 4sides, 2midtowe.

would be the focus of the build. These included the Eastern (back) window, the east wing, the middle tower, and side 1. Full pages of card stock paper were used as central support for the frame of the model, and small strips of card stock were used as corner supports to connect pages together. Once the east wing, tower, and side 1 were completed and pieced together, it was decided that this stage of building point would be an acceptable stopping point for proper visualization to occur.

In order to achieve the desired lighting for presentation of the model, two small strings of blue and white lights were purchased to be placed within and along the exterior of the model. The blue lights were woven within the windows and the central tower of the model, while the white lights were laid on the outside of the model. To achieve a clean white background for photography, the model was placed on the floor under the desk, and the only light source used in the photo was that of the model lights. This set up process can be viewed in figure 6. The final display images of the model are shown in figure 7 below. These angles were chosen as they highlight the detail of the back window, capture the central tower, and create the effect of a scale larger than reality.

Figure 6. Setting up the model for photographing.

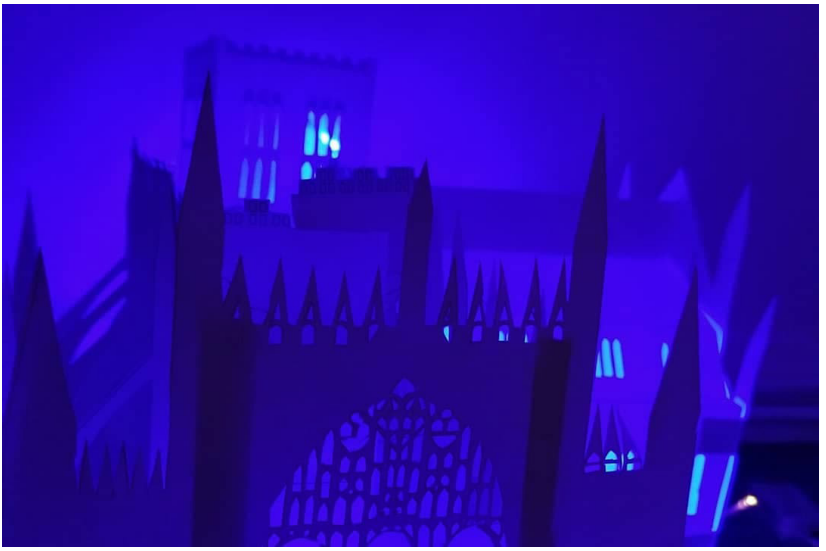


Figure 7. Final visualization of the York Minster Papercraft Mode.

Changes to be Made

With the issues of time constraint and budget, the quality of the model lacked in certain areas. A4 printer paper is quite thin and therefore difficult to work with when creating a standing model. If budget allows, it would be preferred to print the model layers on a thicker card stock paper. This way, the additional support and gluing would not be necessary, and a significant amount of time would be saved in

the construction of the model. Another issue with the design of the templates is the thickness of the lines and the time it takes to carefully cut each individual window. During this process, decisions were made to create sharp cuts on the windows rather than following the exact outline in order to save time. If the lines were drawn at a thinner width, these decisions would be made less obvious when looking at the built model.

Public Outreach

Social media has become an important addition to public outreach and education in the field of archaeology, and many individuals within the community are devoting significant effort towards reaching online communities to foster engagement with a worldwide audience (Watrall 2002, 169; Richardson 2013, 4). With the impact of new methods of data sharing and collaboration, archaeology is able to be experienced, shared, and archived in new and accessible ways (Jeffrey 2012, 553). Within all of these social networks, blogs, and multimedia pages are communities of archaeologists that can be reached through targeted titles and tags.

Throughout the duration of the project, various methods of public outreach were incorporated. These included a live twitch.tv streaming of the adobe illustrator and building processes, as well as photo and video updates on archaeology blogs created on Instagram and Tumblr (figures 8 and 9). Live streaming the building process allows for the audience to interact with the creator, ask questions about the process, and to be inspired and learn from the methods of building being presented. Similarly, the process of blogging provides viewers with updates on projects presented in a casual and relatable format that is easy to understand and engage with (Rocks-Macqueen et al. 2014, 6). This method of sharing allows for content to be freely accessed and engaged with.

The York Minster Paper Craft Model was created with the intention of reaching three specific audiences on social media platforms: Archaeologists/digital archaeologists, Papercraft enthusiasts, and the community of York. These communities were targeted through specific hashtags—such as #DigitalArchaeology, #York, #Papercraft—on all platforms, including links to the twitch.tv stream with each post.

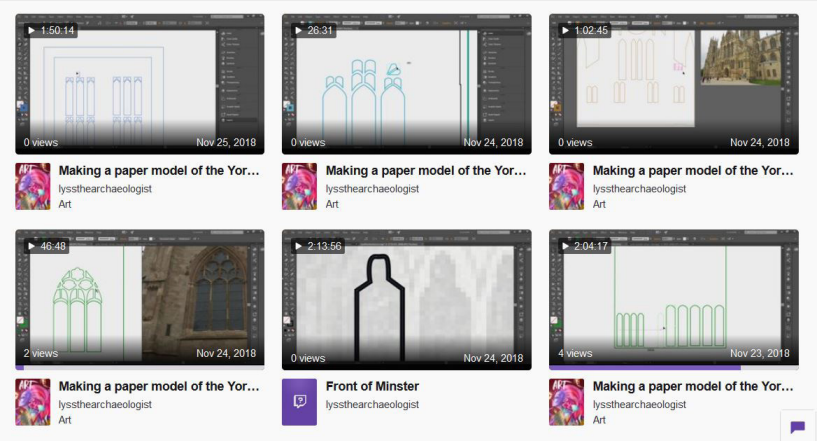


Figure 8. Screenshot of twitch.tv live stream video.

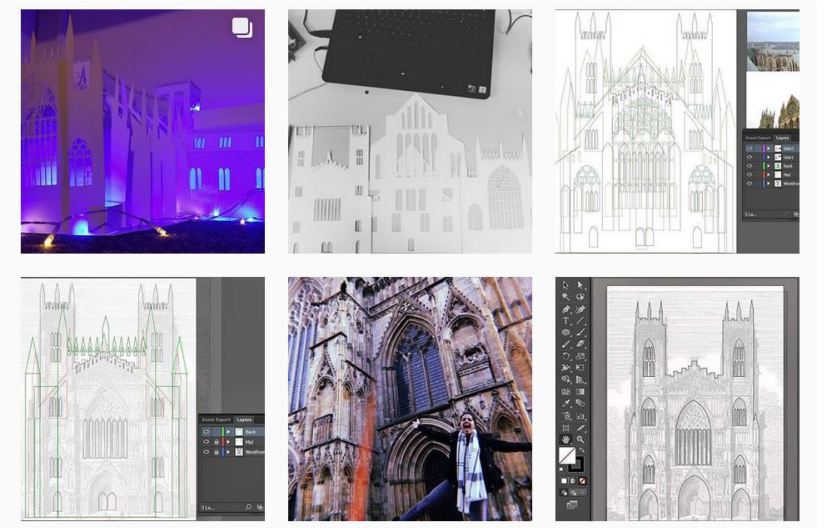


Figure 9. Screenshot of project progress updates on Instagram.

Discussion and Concluding Remarks

The papercraft process does not have to stop after the building is complete. There has been previous research conducted, such as that of Stu Eve, in augmenting papercraft models with 3D and virtual reality overlay. Eve's research of "Augmenting a Roman Fort" incorporated a virtual experience of various Romanesque scenes that one could view when

pointing a smartphone or tablet at the papercraft model of a Roman Fort. By clicking on various buildings within the interface, one could learn about the history and use each individual structure. Stu comments on this experience by stating "For me that is one of the beautiful things about AR, you still have the real world, you still have the real fort that you have made and can play with it whether or not you have an iPad or Android tablet or what-have-you" (Eve 2011). This process of creating augmented reality for heritage visualization could also be applied to the York Minster papercraft model. Possible projected scenes included in this project might reference various activities that went on around and inside the structure, or even an interpretative animation of the building process that occurred in 637 AD (History of York, n.d.).

When building a cultural heritage item for an audience, interactivity is one of the most important factors if the objective is to gain interest and inspire. It is easy to glance over 3D models on a computer screen, but when one is involved in the manifestation of a product and see it come together with their own eyes, a sense of ownership and meaning is incorporated into the object being created. This was my experience throughout the process of constructing the York Minster model. The time, effort, and interaction with audiences during the various phases of construction enhanced my appreciation not only for the art form of papercraft, but also for the history of the Minster and the understanding of the stylistic choices made during its construction so many years ago. The field of archaeology is becoming cluttered with 3D models of artifacts and monuments because of how easy it is to produce them. While these models play an important role in keeping a digital record of the past, they fail to engage with audiences and more importantly they fail to credit the thought processes and efforts that went into constructing the original objects. These past 'efforts' are what give an object meaning, and without a visual representation of that effort, it becomes just another image on the screen.

The value of this resource comes from its accessibility and owes its potential for success to current media tools that allow for archaeologists and heritage enthusiasts to share their experiences on the internet. The ability to observe the model building process, interact with the builder, and then download the files to create your own model makes it easy for anyone who is interested in the art form to be a creator and participate in the history of the object. The history of the York Minster and other heritage sites do not have to remain in the past, and instead their narratives are continually being built upon and shared through archaeology and visualization.

References

Ellwood, N. (2018). King's Manor – The University of York, Department of Archaeology. [online] Nickellwood.co.uk. Available at: http://www.nickellwood.co.uk/projects/kings-manor-york-papercraft/ [Accessed 29 Nov. 2018].

Eve, S. (2011). Augmenting a Roman Fort. [online] *Dead Men's Eyes: Augmented Reality and Heritage*. Available at: http://www.dead-mens-eyes.org/tag/roman/ [Accessed 29 Nov. 2018].

History of York. (n.d.). York Minster. [online] Available at: http://www.historyofyork.org.uk/themes/york-minster [Accessed 29 Nov. 2018].

Jeffrey, S., 2012. A new digital dark age? Collaborative web tools, social media and long-term preservation. *World Archaeology*, 44(4), pp.553-570.

Richardson, L., 2013. A Digital Public Archaeology? *Papers from the Institute of Archaeology*, 23(1), p.Art. 10. DOI: http://doi.org/10.5334/pia.431

Rocks-Macqueen, D. and Webster, C. (eds) Blogging Archaeology. *E-book: Landward Research*. 20-35. Available at http://www.digtech-llc.com/s/2014-Blogging-Archaeology-eBook-35vc.pdf

Watrall, E., 2002. Digital pharaoh: Archaeology, public education and interactive entertainment. *Public Archaeology*, 2(3), pp.163-169.

Visualizing the York Minster as Papercraft: Response

Cassandra Marsillo

Citation:
Marsillo, Cassandra. 2019. "Visualizing the York Minster as Papercraft: First Response". *Epoiesen*.
http://dx.doi.org/10.22215/epoiesen/2019.9

Cassandra Marsillo is a public historian and teacher at Dawson College.
ORCID ID:0000-0002-9932-1802.

Cover Image:
"Bulley, Eleanor. 'Great Britain for Little Britons. A book for children' p45."
British Library Flickr: https://www.flickr.com/photos/britishlibrary/11081935765

Lemonade stands are for suckers. When I was a kid, I wanted to sell papercrafts. Nothing fancy; my biggest production was paper snowflakes. I got pretty good, cutting out relatively complex designs and shapes with my chunky pink scissors. I cut so many that it became like a science to me: I knew that if I cut here, the final shape would show up there. I would imagine and execute patterns of stars, pine trees, hearts, even Santa's silhouette with confidence and ease. But no matter how many I made, the magic of the final moment - unfolding the snowflake to see it in its full beauty - remained powerful. Holding up snowflake after snowflake to the light, I felt that they twinkled just like those that landed on my mittens in the winter (yes, my paper snowflake business venture was a summer activity). Though they were made of ordinary paper, to me, they were brilliant.

As I scrolled down and saw the blue images of the York Minster papercraft draft, I thought of those moments unfolding the snowflakes. I've never seen York Minster in person. The Google Earth image in the article was the first time I laid eyes on it, actually. I can imagine it, though, having seen my fair share of churches, cathedrals, and other significant Gothic heritage buildings. I think of other moments that took my breath away: looking up at the cathedrals in Siena, Milano, and Paris, or Westminster Abbey. Maybe a little more spectacular than my paper snowflakes.

But paper can be magical. I look at the actual image of York Minster from Google Earth and, truthfully, I feel nothing. The first pulse of excitement comes when I open the Illustrator files. Clean and simple, these outlines come from something so complex and intricate. I don't have a printer, but I imagine the patience it would take to slice out each small individual shape, each detail that makes this building unique. Not to mention the patience it took to create these Illustrator files in the first place. I imagine myself trying to cut out the windows of York

Minster with my childhood pink scissors. Impossible. I think how it's pretty neat that I could try it if I really wanted to, just to see how it would turn out. I ask myself: how many computers is this existing on right now? How many changes have been made without me knowing? How many experiments, botched trials and errors; how many fairy lights have lit York Minster, maybe in red, green, or multi-colours?

In its supposed simplicity of printer paper and fairy lights, of tape and glue, this York Minster can be built by my own two hands. I could feel every curve and sharp edge. I could trace the point where each wall meets. In its supposed simplicity, heritage papercraft makes this all tangible. It can push us beyond those moments, standing awe-struck below a towering building. Because if a little paper model makes me whisper "wow," then maybe the enchantment of York Minster, and Notre-Dame, and il Duomo di Milano, doesn't necessarily lie only in the physical structures themselves.

There's so much that can be said about heritage papercraft; about making the tools accessible and interactive; about creating and recreating heritage buildings in our own homes, and what this all means for history and archaeology. As Sara Perry states in "The Enchantment of the Archaeological Record": "We are literally atop untold histories: things, ideas, lives, and activities that we have never seen before, that we may know nothing of, and that can thus endlessly surprise and transform us" (355). Yet papercraft is something we do know, and that bond formed between something familiar and nostalgic and something unknown and untold, that's enchanting.

Touching, building, shaping through papercraft not only allows us to experience built heritage in a different kind of physical way: it's a performative practice. And all performances are unique. There's the image of a young Cassandra, sitting cross-legged on her bedroom floor, flourishing her chunky scissors as the wooden basket beside her fills with construction paper snowflakes. There's the performance of someone hunched over a cutting mat, a thin, silver X-Acto knife in hand, making one small cut and removing one small piece at a time. Stu Eve's "Augmenting a Roman Fort," taking the existing Make This Roman Fort (Usborne Cut-Out Models), and adapting it through an augmented reality app, is an example of another kind of performance: one that exists both in the "real" and virtual worlds. The York Minster project is open to this kind of intervention as well, keeping the construction blank and available for a variety of virtual and physical

adaptations depending on the builder. In both the Roman fort and the York Minster, builders are meant to navigate between instructions and intuition, bringing their own agency to histories past; bringing these histories past into the present. Everything in between and beyond adds another layer of performing the construction and history of built heritage through papercraft. Not only to understand that construction and history, but to expand it.

How do our relationships to built heritage change through papercraft? How does that moment of enchantment - turning on the fairy lights so that our model York Minster glows blue from the inside - reshape our experiences with built heritage? I think it offers the opportunity for us to make diverse and meaningful connections, not just to the building's past but to the moments that our pasts have intertwined with it. To look at built heritage, then, is not passive, but becomes an active process of understanding on a deeper, more personal level, how our histories are physically and emotionally linked to the past.

To look at built heritage and remember your pink scissors; to see the model York Minster and remember your woven basket of snowflakes on your bedroom floor; that's special. And so, I have snowflakes on my mind. The only way to shake it is to make one right now.

References

Eve, Stu. 2011. Augmenting A Roman Fort. Dead Men's Eyes Oct 20. https://www.dead-mens-eyes.org/augmenting-a-roman-fort/

Perry, Sara. 2019 The Enchantment of the Archaeological Record. *European Journal of Archaeology* 22(3), 354-371.

Messy Assemblages, Residuality and Recursion within a Phygital Nexus

Ian Dawson and Paul Reilly

Citation:
Dawson, Ian, and Reilly, Paul. 2019. "Messy Assemblages, Residuality and Recursion within a Phygital Nexus" *Epoiesen*
http://dx.doi.org/10.22215/epoiesen/2019.4

Ian Dawson is Lecturer, Fine Art - Sculpture within Winchester School of Art at the University of Southampton. ORCID: 0000-0002-3695-8582

Paul Reilly is Visiting Senior Research Fellow in the Department of Archaeology, University of Southampton. ORCID:0000-0002-8067-8991

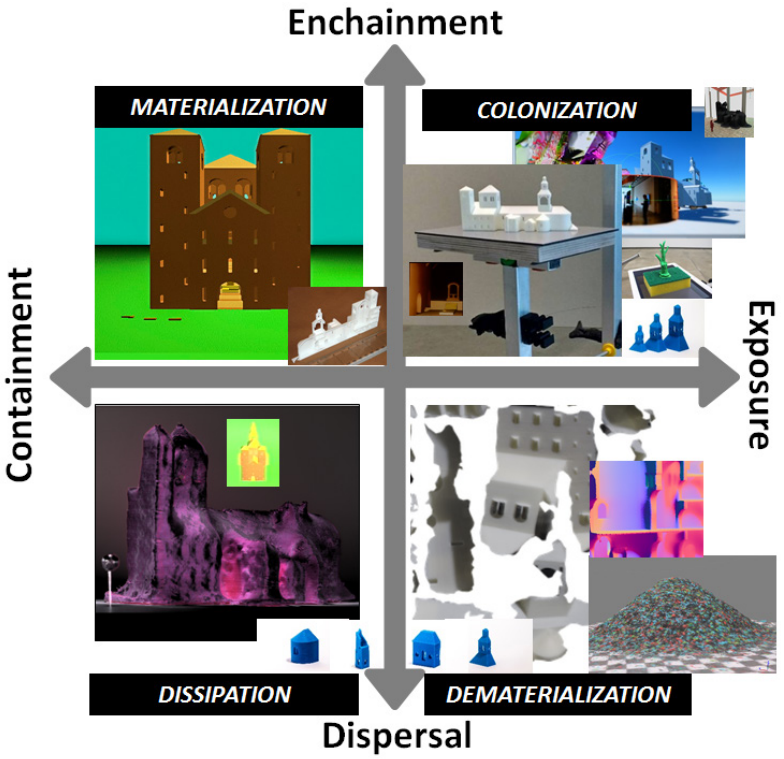
Cover image courtesy of Ian Dawson and Paul Reilly.

Abstract

This visual essay is a reflection on the movement of objects and images within the phygital and, in particular, how different components of assemblages meet, mingle and sometimes experience ontological shifts, when an artist and an archaeologist, and their practices and apparatus, intra-act within a 'phygital nexus'. Phygital objects are digitally defined but can be invoked, instantiated and brought into constellation with other entities both physically and virtually. A phygital nexus can be thought of as a no-place and an every-place where digital and physical worlds intersect; a space where novel, 'messy assemblages' can emerge. In our collaboration, we constantly subvert the phygital nexus to appropriate and remix components of multifaceted, multi-(im)material, and multi-temporal phygital objects that recall themselves - nested and extended assemblages of persistent (im)material artefacts and other residues - and refract them through both our distinct, and combined interdisciplinary, critical practices, to produce new ontological assemblages, further residues of an ongoing collaboration, which we map onto Gavin Lucas' Grid of forces of assembly and disassembly.

The residues and traces of this reflexive collaboration includes this essay and an assemblage of art/archaeology forms that comment, recursively, on both previous and subsequent assemblages, and our practices.

Visual Abstract



Introduction

This visual essay is a reflection on the movement of objects and images within the phygital and, in particular, how different components of assemblages meet, mingle and sometimes experience ontological shifts, when an artist and an archaeologist, and their contrasting practices and apparatus intra-act (sensu Barad 2007) within a phygital nexus (e.g., Gant and Reilly 2017). A phygital nexus can be thought of as a no-place and an everyplace in which the boundaries between what is physical and what is virtual are blurred, where digitally-defined objects (actants) are susceptible to transmutations and may be (re)deposited within multiple parallel or intersecting physical and digital assemblages (e.g. Reinhard 2019a), and are able to 'jump' almost anywhere in our digitally hyper-connected universe. In addition, phygital objects can be invoked, instantiated and brought into constellation with other practices and entities both physical and virtual, and 'messy' assemblages can, and do, emerge from these interventions.[1] Phygital transformations, moreover, may be multi-directional: digital objects can become physical and, conversely, material instantiations can be virtualised.

In our collaboration, we constantly subvert the phygital nexus to enable us to appropriate and remix components of multifaceted, multi-(im)material, and multi-temporal phygital artefacts that recall themselves - nested and extended assemblages of persistent (im) material artefacts (2) and other residues - and refract them through both our distinct, and combined interdisciplinary, critical practices, to produce new ontological assemblages, further residues of an ongoing collaboration.[2] The residues and traces of this reflexive, team SHaG-like collaboration, has evolved iteratively as we each handed over work

[1] Although it will not be explored at this stage, we recognise and embrace the potential to learn from the embodied practices of other maker communities in the phygital. For example, Bettina Nissen (2014) used small 3D sensors to track the gestures of crochet makers and 3D printed their creative movements. Elsewhere, another maker, Janelle Shane (2018), trained a neural net to create new knitting instructions, which members of the online knitting community Ravelry interpret in creative ways into physical creations.

[2] Being (im)material is a grey zone where material and immaterial aspects of an entity coalesce. An example of an (im)material entity would be the combination of the immaterial code definition of an object and its 3D material printed output (Buchli 2015). See also Figure 27.

Figure 1: Interlaced studios

Figure 2: phygital Old Minster UV fragments collage

in progress to the other (Figure 1) to be enriched and developed (see Sillman, Humphrey and Green n.d.), and includes this essay and an assemblage of art/archaeology pieces that comment, recursively, on both previous and subsequent assemblages, and our practices.

Assemblages and Residuality

The term 'assemblage' has many connotations. In art it refers to the combination of found and collected objects into a composition (e.g. Figure 2). In western tradition, it is commonly asserted to have begun with Picasso in 1918 and extends like collage as a methodology (e.g. Craig 2008) to take images and objects away from their proper function so as to see them for what they might be (Hamilakis and Jones 2017, 77-79). As Theodor Adorno would say "Art is magic delivered from the lie of being truth". In archaeology, the concept of assemblage has traditionally had two main distinct, but overlapping, meanings. It can refer to "a collection of objects associated on the basis of their depositional or spatial find-context (e.g. midden assemblage) and a collection of one type of object found within a site or area (e.g. pottery assemblage)" (Lucas 2012, 193-4). However, Gavin Lucas, building on Manuel DeLanda's assemblage theory, who draws, residually, on the philosophy of Giles Deleuze and Felix Guattari, has rearticulated the concept of archaeological assemblages to foreground their external relationships, such as their relations to their environment and other assemblages, as opposed to the internal configurations of their component parts, which are recognized as having a certain amount of autonomy, insofar as they can move between assemblages and recombine elsewhere in other spatio-temporal contexts.

As Lucas (2012, 204) observes, '[a]lmost all, if not all, objects are strictly speaking residues of prior assemblages'. He deploys two analytical frameworks he describes as 'grids of forces' in order to inject theoretical depth into the study of archaeological assemblages: the first grid analyses permeability versus persistence, the second allows us to investigate the tension between the forces of assembly versus disassembly. It is this latter grid of forces operating on assemblages that our collaboration is currently most concerned with. Within this framework (see Figure 3) Lucas' focus of attention is firmly on the tension between the processes of (re)materialization and dematerialization (Lucas 2012, p. 213, Fig. 16). However, Reilly (2015a) also foregrounded the

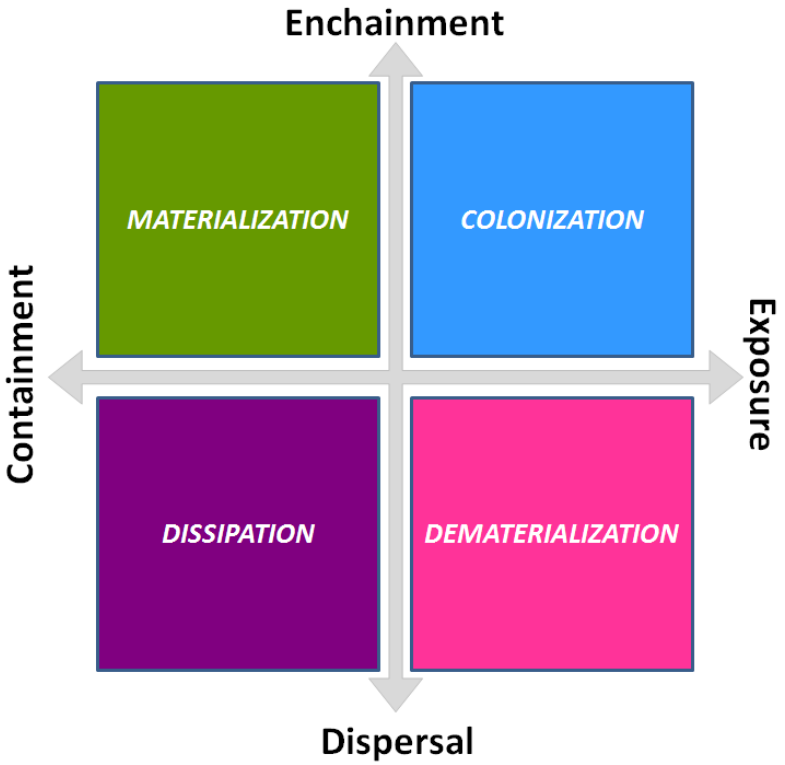


Figure 3: Modified Enchainment versus Containment Grid of Forces (after Lucas 2012, Fig. 16, p.213)

two other active forces operating in the complimentary spaces of this framework. Colonization and dissipation also have vital roles to play within assemblages, principally in reconfiguring or extending them, particularly in the phygital. Colonization is shaped by the dual processes of enchainment (also described as coding, or citation) and exposure (or deterritorialization). This force maintains the material coherence of the assemblage even though it might be displaced, perhaps far away, in time and space from its original setting and meaning. However, the vastly accelerated rates of recursion and residuality enabled in the phygital nexus opens up the possibility of uncontrollable mutations and glitches, both miniscule and major, and other accidents of context or reproduction (e.g., Virilio 2003; Minkin 2016). Colonization can thus radically reconfigure the topology and boundaries of assemblages. By contrast, the entropic force of dissipation harnesses the twin

processes of containment and dispersal, meaning that elements of an assemblage break up and disintegrate, but largely remain close to their original setting. Whether or not the assemblage is subject to the processes of containment or deterritorialization, persistent components that transfer into new contexts and assemblages can also be considered both 'itinerant objects' (Joyce and Gillespie 2015) and residuals.

'Residuality' refers to the phenomenon of objects, fragments or materials that persist and reoccur in contexts other than those they originated in (e.g., Brown 1995; Lucas 2017).

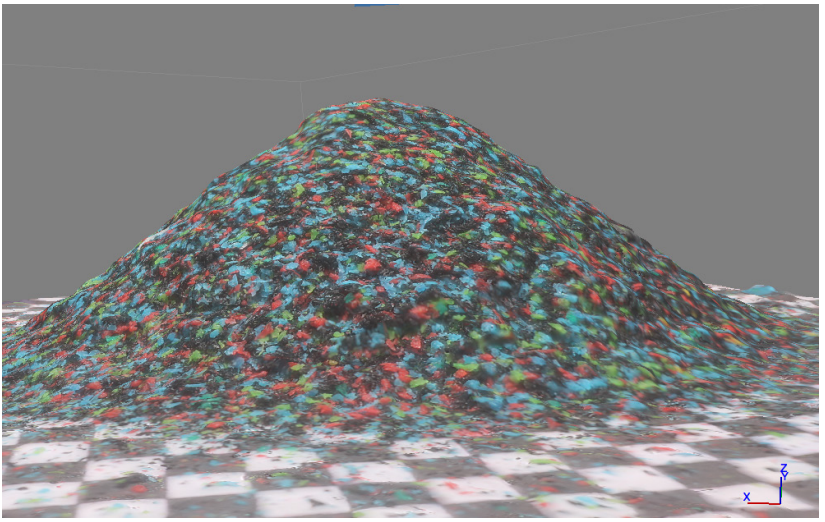


Figure 4: PLA spoil heap - a study in phygital Disassembly/Assembly

Residuality introduces an element of stochastic variability into assemblages as new relational properties, and alternative agentic impact may develop depending on the (re)configuration of their components (e.g., Figure 4) and the particular capacities and agencies of the elements from which it is composed (see Hamilakis and Jones 2017; Jones 2018, 23).

Some things last longer than others and may acquire quite extensive biographies. Pottery and plastics, for example, are particularly persistent and are constantly being dug up from one context and removed into new ones. Consider the sinking of a well. The excavator cuts

through pre-existing deposits redepositing materials from earlier temporal horizons into subsequent, increasingly messy, assemblages and contexts containing (re)mixed, or reworked, components originating from multiple temporal horizons. In this shift of context some residual objects within the assemblage may experience ontological transformations. For instance, a flat, circular ceramic object may originally serve as a plate, but if it is broken its material residues - principally sherds - can start to disperse. Every residual object has the potential to become a fresh component of one or more subsequent new contexts in which the ceramic material might become, for example, pieces in a mosaic, or rubbish items in a pit, rubble in a trampled floor, packing material in a posthole, and archaeological evidence.

The residual objects outlined above are more or less materially persistent. Their shape may have been radically altered, but some of the original material they were composed of is still present. However, sometimes it is only the form of the object that persists, while the material in which it was previously instantiated is recursively replaced. Reilly (2015a), for instance, traces different objects made from the voids encountered at Pompeii (e.g., casts, effigies, pseudomorphs, skeuomorphs and 3D prints, amongst others). The recursive, or self-referencing, component here is the form of the original or prototype. Consider the maintenance of an ancient church. Over the centuries elements of the fabric and furniture of the building degrade and must be replaced. Probably every major minster still in use in Europe has a team of masons replacing elements of the persistent conformation we share with previous generations, but using freshly quarried stone.

Phygital assemblages can be both, or either, residual or recursive in nature, since phygital objects are easily replicated, aggregated, augmented, resampled, processed, or transcoded into other formats, and can be redeposited in different materials and at different scales (e.g., Figures 4, 5, 6, 7, 8 & 9). Moreover, dimensions can be flattened (e.g., Loyless 2019), and planes turned (e.g., Figure 9), recalling the strange loops and paradoxes of the recursive structures and processes that fascinated the likes of Gödel, Escher, and Bach (Hofstadter 1979).

Figure 5: PLA reprint iteration 3

Figure 6: UV fragments II

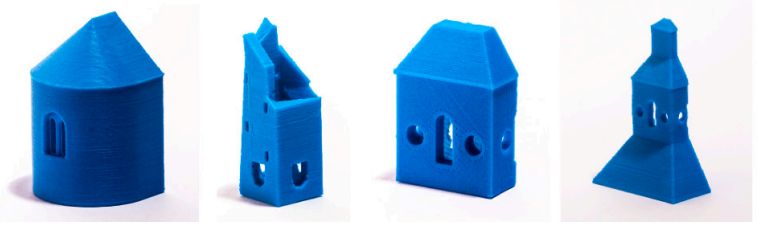


Figure 7: Hack Minster Hoard

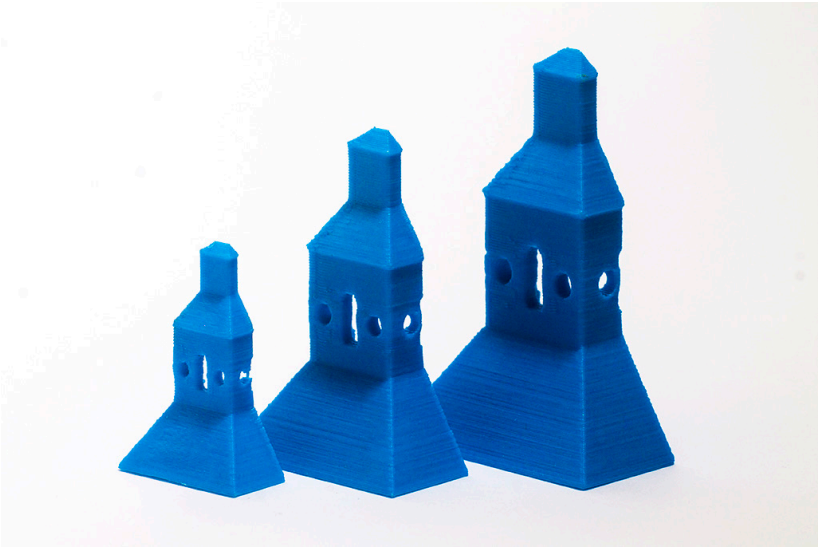


Figure 8: Scale as recursion +/- 1

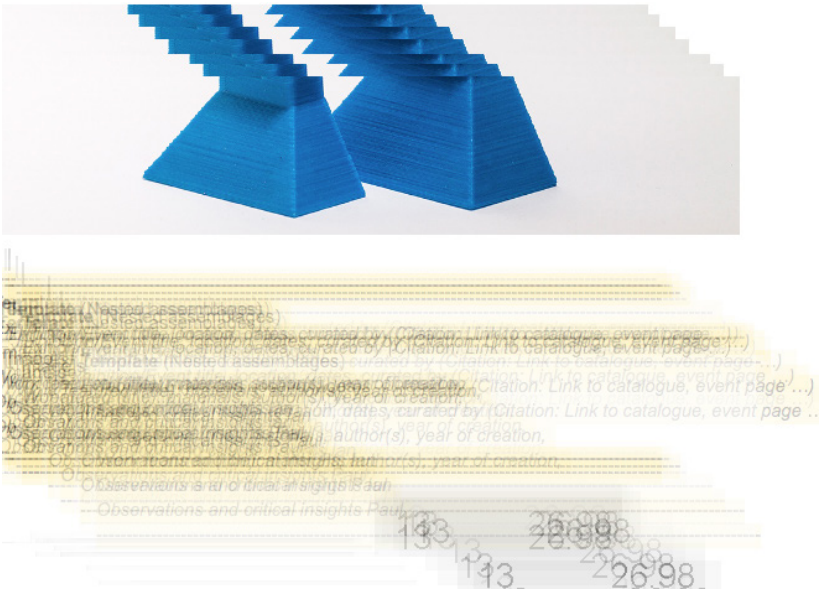


Figure 9: Stair of churches

Thus extended, these phygital assemblages are susceptible to new kinds of exploration and analysis, and may be productively recontextualized, reiterated, (re)materialized, reconceptualized, re(con)figured, and (re)discovered. For instance, a digitally rendered edifice may at one moment shrink away as the virtual explorer flys - angel-like - around it, but in the next instant the virtual pedestrian explorer can be enveloped by the interior of the same so-called 'solid' model. Both journeys can also be endlessly transformed by adjusting lighting schemes and the resolution used. Equally, the identical digital solid model definition code may produce a 3D material print. Here too myriad perspectives disclose themselves and new registers of intra-action emerge. At one end of the scale, such a physical model might be 3D printed as a hand-holdable and discoverable plastic miniature which could furnish a small-scale diorama. At the other, it is also theoretically possible to 3D fabricate the same digitally defined assemblage in almost any material (e.g. Figure 10), or indeed multiple, or composite, materials, at any scale, including life size (Reilly 2015b; 2015c).

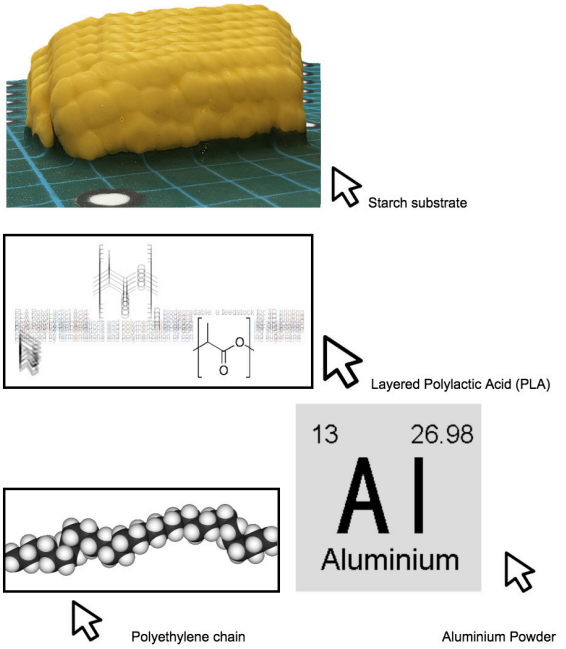


Figure 10: 3D printing deposits

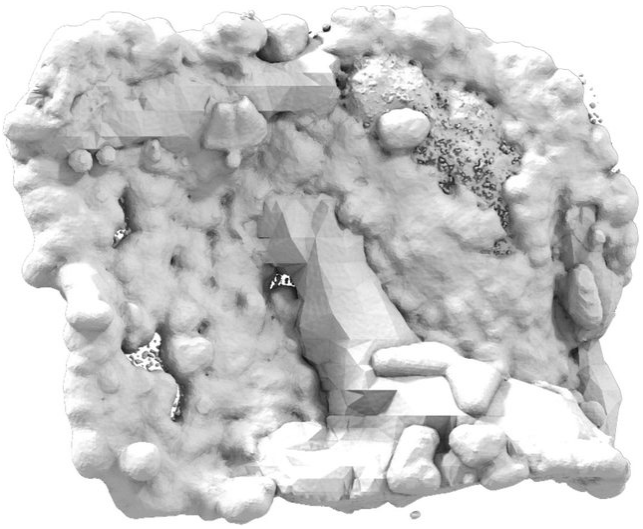


Figure 11: Plastic Print derived from aggregated images of the Devil's Chair, Avebury (Louisa Minkin 2015, with permission)

Many other ontological transformations abound in the phygital and can occur in very rapid succession. Consider Louisa Minkin's Plastic Print derived from aggregated images of the Devil's Chair, Avebury (2015). For this piece (reproduced in Figure 11), Minkin aggregated images taken by tourists adopting the same pose at this iconic megalith over many years to produce a 3D material 'souvenir object of uncertain spatio-temporal status' (Minkin 2016, p.122, & figure 3, p.123). This disturbing temporal-frankenstein-like simulacrum is also a phygital coloniser. Reversing the same technology flows, born-digital physical instantiations can break back into the virtual realm via computational photography, such as photogrammetry (Figure 12 & 34) or Reflectance Transformation Imaging (RTI) (e.g., Figure 13), and a rapidly expanding assemblage of other scanning technologies. Such apparatus has been characterised by Jeremy Huggett (2017) as 'cognitive artefacts' that encapsulate hidden recursions of the practices, techniques, calculations, and interventions that help us explore, reveal, capture, and characterise archaeological objects (see also Jones 2002; Latour and Woolgar 1986). Black-boxes or not, such instruments (of colonisation) are now commonplace in both archaeological (e.g., Beale and Reilly 2017; Graham 2018; 2019; Jones and Díaz-Guardamino 2019) and artist practice (e.g., Beale et al. 2013; Minkin 2016; Petch

2019; Dawson in press). However, all DSLR images and digital scans are based on point measurements and no matter what resolution is adopted they are still only digital surface samples, and consequently always considerably less than the original subject under examination (Carter 2017). When such point readings are interpolated into meshes for 3D renders or 3D printing a significant proportion of these sampled data are discarded algorithmically. In other words more detail is being lost with each new recursive rendering, print or scan. We also explore this phenomenon in our collaboration which presents itself in second or third generation print-outs as a gradual softening of form as once sharply defined conformations are digitally eroded (e.g. compare Figures 5 and 17).

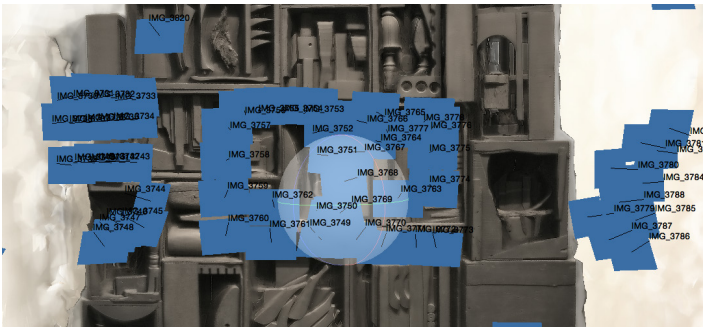


Figure 12: Double assemblage

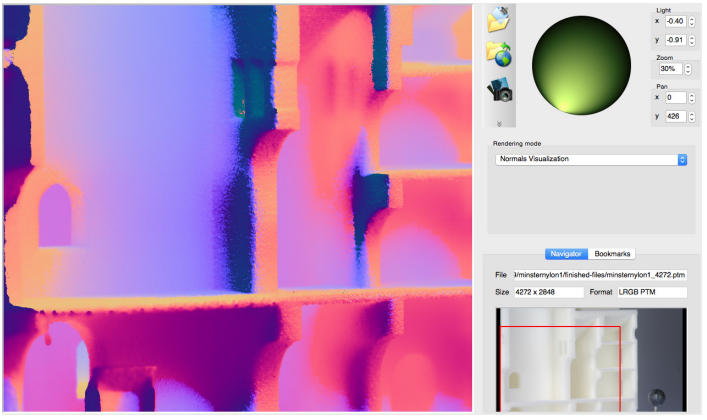


Figure 13: Triple spoof chameleon architecture: interior RTI image of a 3D print of an archaeological Constructive Solid Geometry (CSG) modelled re-imagination of a building annihilated in CE 1093/4

Many of RTIs featured in this essay virtually (re)presence a 3D printed re-imagination of the digital Old Minster of Winchester. RTI is a computational photography technique in which known lighting information derived from multiple digital photographs is mathematically synthesised to build a model of the subject's surface shape and properties.[3] However, as Andy Jones and Marta Díaz-Guardamino (2019, 213) make clear, "[i]t would be a mistake to assume that RTI images were simply photographs; they are ontologically complex composite constructed images, with a certain kinship to the photographic". In a sense, the initial geometry and surface properties of the object of study retreat, or dissipate, into residual 'surface normals' and morphing shadows as the RTI algorithms generate a kind of mathematical mirage, yet another recursion accompanied by another ontological shift, and representing a second or third order 'spoof' of the initial geometric re-imagination (Figure 13).

As viewer, subject and RTI parameters playfully intra-act, the on-screen mirage is continually reinvented, chameleon-like, producing a stream of surrealist visualisations, radically altering our apprehension of light, space and surface.[4] For example, applying specular enhancement to a previously dull matt surface has the effect of shining harsh raking lights across a now shiny surface, producing almost haptic

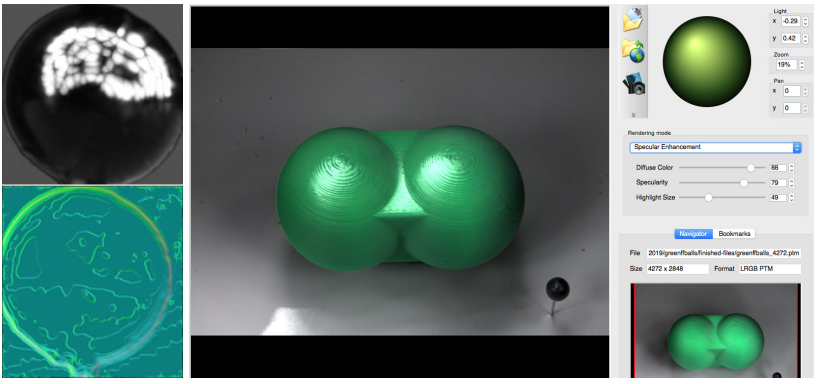


Figure 14: Specular RTI Balls

[3] Refer to Cultural Heritage Imaging for an excellent up-to-date introduction to, and state of the art examples of, RTI practices (@chi): http://culturalheritageimaging.org/Technologies/RTI/

[4] Recalling the work of film collage artist Joseph Cornell (1942).

highlights and shadows (e.g., Figure 14), which can often reveal surface information that is not immediately disclosed under direct empirical examination of the original physical object or, indeed, the individual initial digital photographs. Key to the production of RTIs is the inclusion of a highly polished sphere in the assemblage; the highlights produced on the sphere by each differently positioned flash of the strobe are used to derive the surface geometry of the subject of study.

Jude Jones and Nicole Beale (2017) have foregrounded the performative nature of RTI and, indeed, another significant set of performative recursions is captured through the mirror-surface of the sphere with every strobe of the flash. During each of these entangled intra-actions, the 3D object, the camera, the flash, the reflective sphere itself, and the photographer (archaeologist/artist) mark one other with residual traces of light. In fact, the recursive reflections caught in the surface of the sphere create the total assemblage's spontaneous and co-authored signature. The entangled traces of light embedded in the RTI may also be conceptualised as auto-archived paradata (Bentkowska-Kafel,

Figure 15: Meeting the assemblage halfway performance with auto-archived paradata

Baker and Denard 2012) recording the circumstances, environment, relative position, poses, and the condition of all the actants and their intra-actions in this emerging polynomial assemblage as it unfolds from frame to frame (Figure 15).[5]

In summary, by placing assemblages within a phygital nexus, we open up fresh possibilities for digitally creative disarticulations, repurposing, and disruptive interventions (see Bailey 2017), offering phygital 'acts of discovery' beyond the spade, pencil, brush, leaf or the screen (see Edgeworth 2014), and in so doing unleash new potential for novel and, perhaps, productively provocative conceptions of residuality and recursion.

In the next section we develop our case study: the extending phygital assemblage of the Old Minster of Winchester.

Initial residues and recursions of the Old Minster of Winchester

In CE 1092, the Anglo-Saxon cathedral of Winchester known as the "Old Minster" was probably the most imposing building in pre-Norman Britain. However, in 1093/4, the Old Minster was completely obliterated to make way for the construction of the Norman complex we can still visit today. A substantial part of the site of the Old Minster was excavated by archaeologists in the early 1960s who discovered that this once imposing ecclesiastical edifice had been entirely dismantled down to, and including, its foundations (Biddle 2018; Kjølbye-Biddle and Biddle forthcoming). Indeed, by 1963, the only trace of the Old Minster was it's footprint and some rubble, captured by the robber trenches left and subsequently buried after the Old Minster's foundations had been removed at the end of the 11th century. A decade after these excavations had closed, the principal archaeological investigators wanted to convey the scale and form of the Old Minster to the general public in an easily accessible way. They turned to what was then cutting-edge digital technology and, in 1984-6, several software encoded models describing distinct phases in the development of the Old Minster were created and rendered using IBM proprietary experimental solid-modelling software to produce the first digital recursions (Reilly 1989; 1992; 1996).

[5] To be distinguished from intentional metadata, that is the explicitly defined descriptions or attributes of the logged data (e.g., camera model, image size and format, date and time, specularity, diffuse gain parameters etc.) and the recorded reasoning and evidence embedded in the virtual anastylosis.

Expanding the Old Minster Assemblage into a Phygital Nexus

By recursively generating single view static images ('frames') from incremental simulated viewpoints (e.g. Figure 16) the world's first computer-animated virtual tour of an archaeological re-imagination emerged. Versions (further recursions) of The Old Minster, Winchester 'movie' were shown on TV and exhibited at the British Museum, others were encoded in PAL, NTSC, and SECAM and distributed initially on VHS, U-matic and Betamax video cassette (tape) formats, and later using CD and DVD formats burned into the next generation of material substrates.

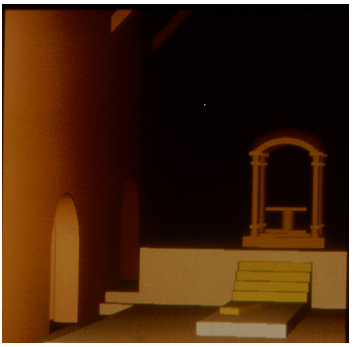


Figure 16: Old Minster frame, 1984/5.

Figure 17: Lossy Old Minster PAL-U-matic-VHS copy

Figure 18: Re-imagined final phase c.1092 Old MInster CSG model using OpenSCAD, 2015

Unfortunately, the only surviving residue of the first minster movie is a JPEG3 recursion of a VHS PAL tape video, which itself was copied from a U-matic video tape master. It serves to remind us that while the initial geometric definition of the re-imagined Old Minster may have been orthothetic in nature (Stiegler n.d.), each instantiation, re-registration (e.g. scan, JPEG photographs, video, or 3D print) and, more often than we might realise, every time such digital instantiations are compressed for transmission a degree of digital decay or entropy is introduced (e.g., Figures 17, 21 & 22). With each new codec decoding/encoding recursion the video image resolution was decreased, and more information dissipated through the inherent lossyness of each successive encoding (see Horowitz 1998; Cubitt 2014, 249).

However, as technology advanced, the experimental software, hardware and distribution media standards that the digital Old Minster model was built on became obsolete, and the models retreated into the background. Actually, the makers thought them to be lost. However, in 2015 residues of the digital Old Minster in the form of the original proprietary model definition files were rediscovered buried within

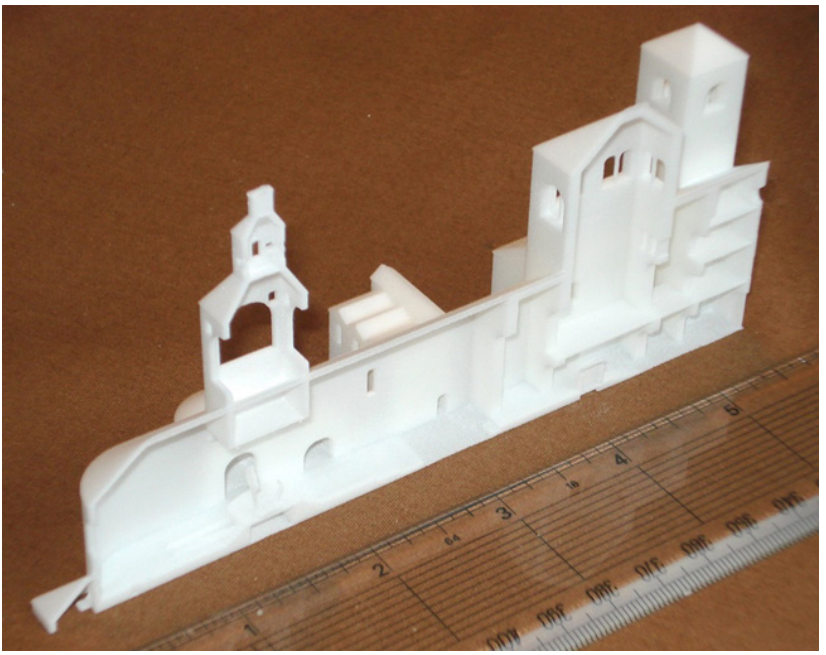


Figure 19: Initial phygital Old Minster, 2015.

layers of unsupported experimental code and recovered.[6] Fortunately, although the models were written in a dead language, these seminal virtual artefacts could be restored and reaccessed by translating them into a modern orthothetic definition using open source code (Figure 18).[7] Such open code and digital technology offers many new and productive affordances for exploring and recontextualising the digital Old Minster. For example, besides supporting virtual settings in interactive graphical contexts (e.g., programbits.co.uk/minster/minst.html), the same digital objects can be explored in VR (e.g., Figure 29) or materialised in different and multiple materials as 3D prints (Figure 24), effectively moving the setting off the screen and onto the stage as it were, and giving substance to digital objects which would otherwise be, as Monika Stobiecka (2019) wryly puts it, 'deprived of their matter'. Critically, in this latest ontological shift, we gain multisensorial, multimodal, and embodied experiences with tangible objects of increased cognitive depth.

The digital Old Minster is thus an expanding, constantly morphing, ontological assemblage of (im)material digital objects within our phygital nexus. To recap, its geometric properties were initially presented virtually, that is on screen using ray-casting algorithms, but decades later the same geometry was instantiated as a material 3D print. As we have already observed, 3D prints, like any other artefact, can be photogrammetrically (re)captured or scanned and (re)virtualised as, for example, point-clouds or mesh recursions which can in their turn be (re)deposited and recontextualised (e.g., Figures 20, 21, 22, 23 & 24). For the remainder of this visual essay we will intra-act with several ontological assemblages drawn from the phygital nexus of the digital Old Minster.

---

[6] Increasingly, digital archaeologists are starting to explore the archaeology of code (e.g., Reinhard 2019b) and obsolete hardware and media platforms (e.g., Moshenka 2014; Perry and Morgan 2015; Beale, Schofield and Austin 2019).

[7] A detailed account of the making of both the original and the new open digital models can be found in Reilly, Todd and Walter 2016.

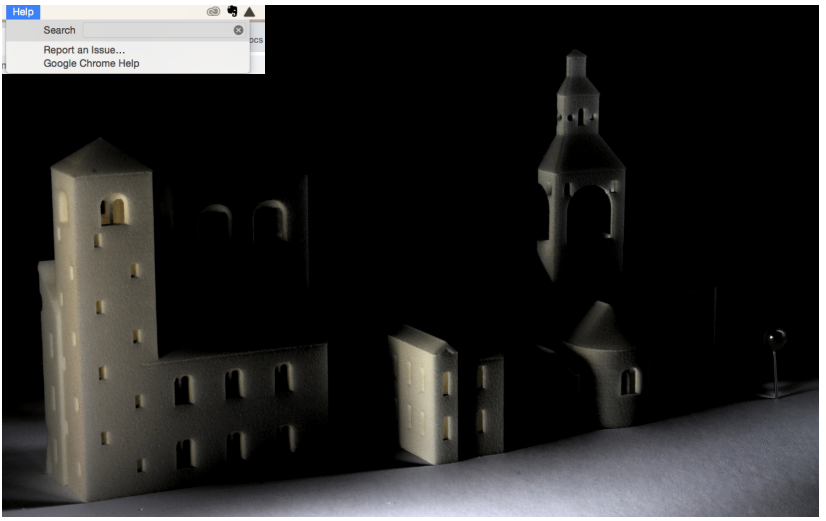


Figure 20: Phygital Old Minster Synthetic Sundial (RTI GIF 3D)

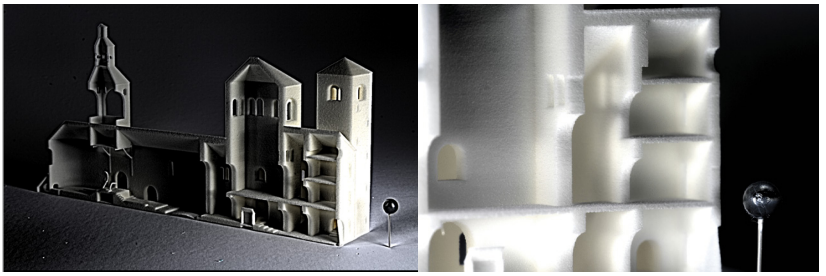


Figure 21: Old Minster section RTI Mirage (RTI and RTI GIF detail)

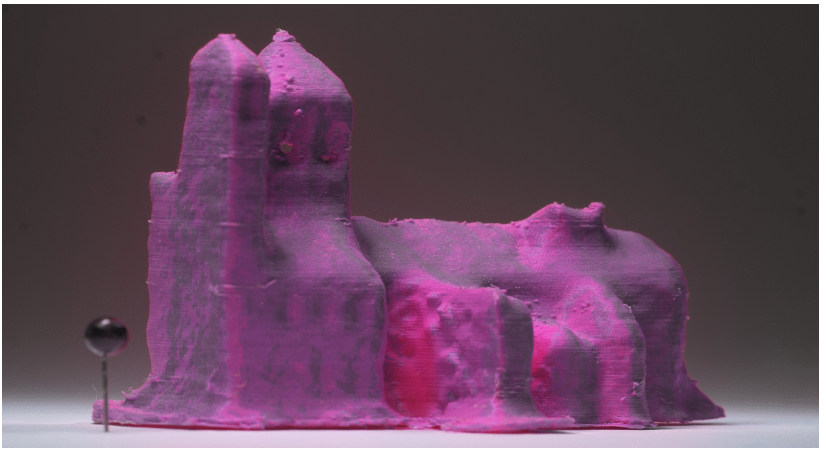


Figure 22: Dissipating Phygital Old Minster v.3 (RTI GIF 3D print)

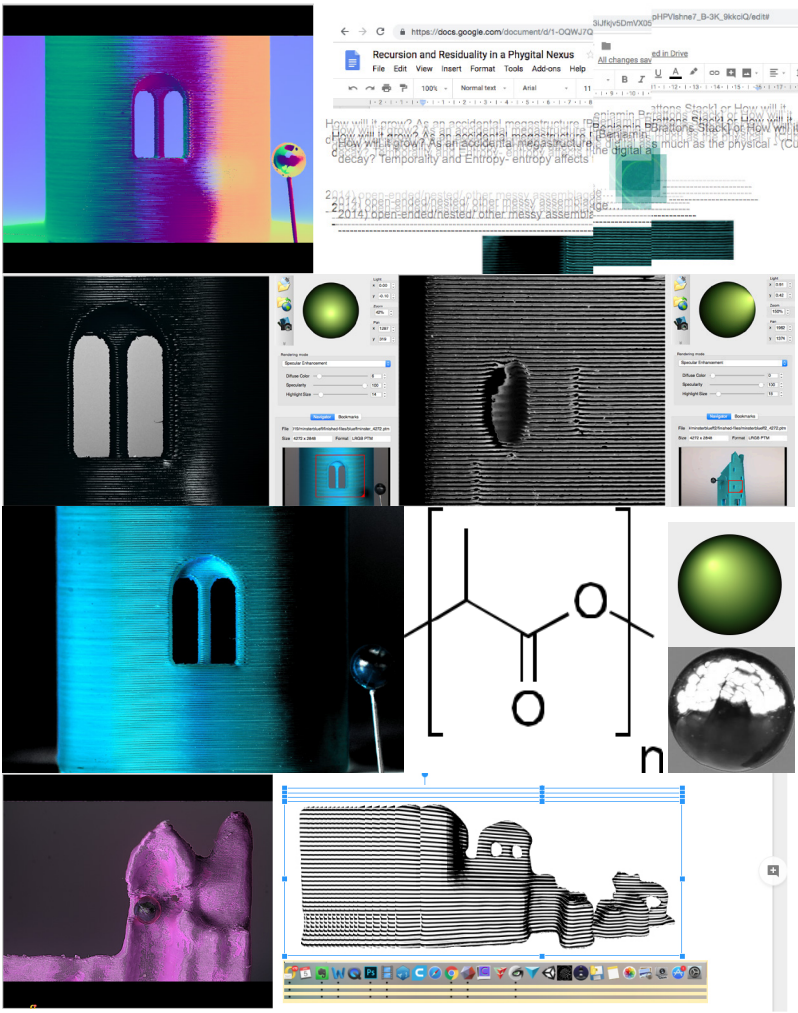


Figure 23: Messy Ontological Assemblage Collage

Further Recursions and Residues: Exhibitions

Throughout this collaboration, our interdisciplinary (art/archaeology) conversation about assemblages has been, and continues to be, syncopated with exhibitions in which we attempt to distil some of our insights into art forms, and yet further recursions and residues from prior assemblages. Like the assemblages we feature, our commentary is messy, as we interject our reflections using a combination of text and collaging.

Sightations, TAG 2016, Southampton (19.12.16 –21.12.16) Curated by Joana Valdez-Tullett, Helen Chittock, Kate Rogers, Eleonora Gandolfi, Emilia Mataix-Ferrandiz, and Grant Cox

The Sightations exhibition at the Theoretical Archaeology Group conference held at the University of Southampton in December 2016 provided an important focal point where art and archaeology practices could come into constellation. The work featured by Ian Dawson was called ten (Figure 24).[8]

Despite being exhorted by an artist 'not to over analyse it', it is difficult for an archaeologist not to respond to ten other than as a treatise on archaeological excavation recording. At a distance, the succession of red, white and black marks, evenly distributed down the length of the square-profiled aluminium bar, shouted out 'levelling staff' - a surveying companion on many excavations. The juxtaposition with the 2m red and white ranging rod, typically used as a photographic scale on site, reinforces this reading. Looking closer, the archaeological excavation narrative really seems to come alive as the 'graduation marks' resolve themselves into well-known artefacts, physical memories, waymarking temporal horizons, being registered by the staff (Figure 25).

In the same room, Paul Reilly's featured work was called: (Im) material Old Minster (Winchester), 2016. This piece also alluded to time depth and persistence (Figure 26). The little white mono-material 3D print, fabricated via the web using shapeways.com in 2016, was accompanied by two 2D colour prints of the same digital object as it was rendered 30 years previously, each residual artefact, from different time horizons, a recursion embedded in a shared, but fleeting present, beckoning new residual assemblages to emerge.

[8] http://www.iandawsonstudio.com/ian-dawson-along-the-riverrun.html

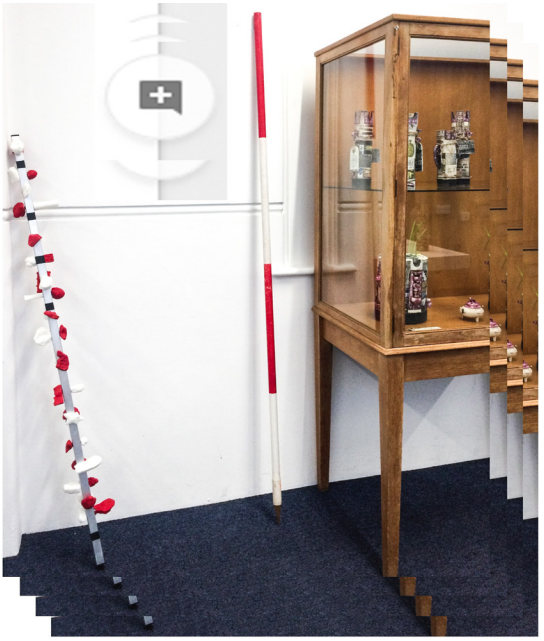


Figure 24: ten (Ian Dawson, 2016, Aluminium, fused filament 3D prints and ranging rod)

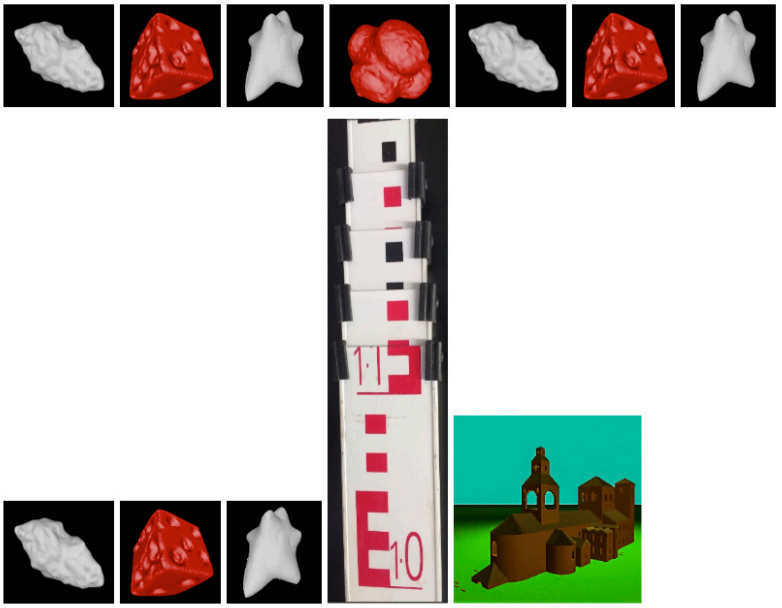


Figure 25: ten temporal horizons

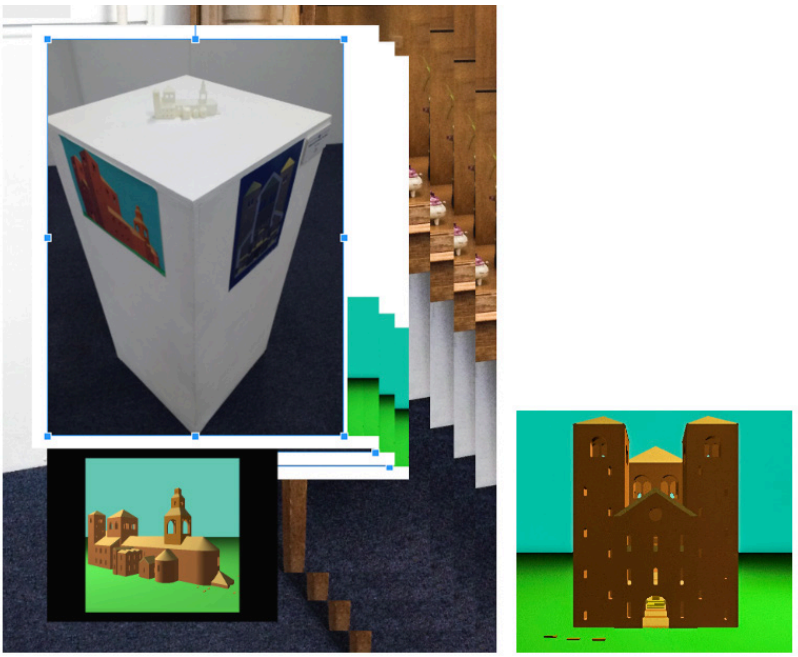


Figure 26: (Im)material Old Minster (Winchester) 2016 continued (Fused filament 3D print and printed photographs on paper)

Annihilation Event, Lethaby Gallery London (22.03.17- 29.03.17) Curated by Louisa Minkin and Elizabeth Wright

The next opportunity to develop our conversation, was the Annihilation Event, held in the Lethaby Gallery, UAL, London. The assemblage was billed as having "no singular origin, but many strands and streams ... a project about copies, prints, scans, derivations, reconstructions, casts, and virtual models". The work we featured was titled Digital Old Minster, the archaeology of a digital file (Paul Reilly & Ian Dawson, 2017, Aluminium and fused filament 3D prints). Here aluminium bars affixed with residual 3D printed objects frame the plastic Saxon minster in a rather gothicesque assemblage of gargoyles and flying-buttresses.

As part of the Digital Old Minster, the archaeology of a digital file exhibit, we extended the assemblage, in collaboration with Louisa Minkin, by creating a virtual reality installation of the Old Minster (Figures 29 & 30). Visitors were allowed to deposit virtual objects within the VR Old Minster, thus creating a recursive exhibition space within the exhibit itself, which was of course also within the main exhibition space, and so producing a kind of Old Minster 'Tardis' (9), where space and scale were weirdly warped.

Figure 27: Digital Old Minster, the archaeology of a digital file, 2017 (Paul Reilly & Ian Dawson, Aluminium, fused filament 3D prints)

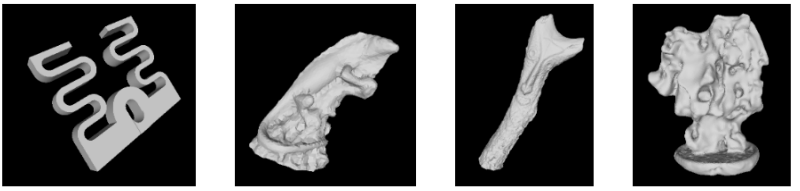


Figure 28: Material prints embodying immaterial code introduce the (im)material grey zone

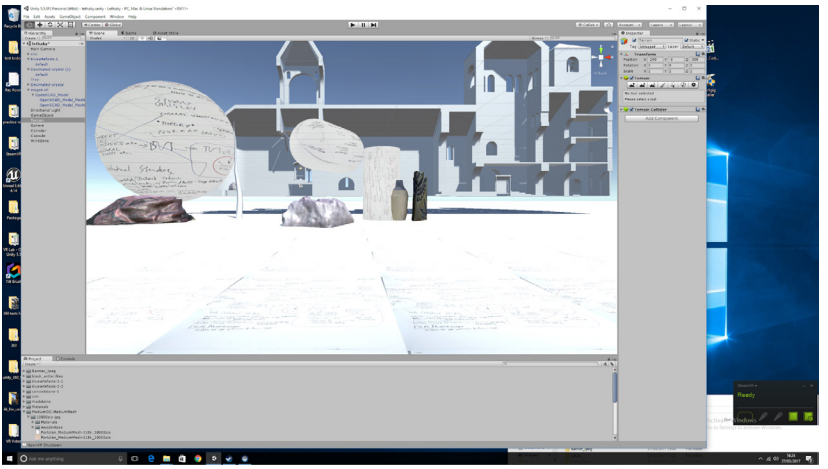


Figure 29: Recursive Assemblage (exhibition space). Screengrab from Unity VR build, Annihilation Event, 2017 (Louisa Minkin, with permission)

Figure 30: Recursive Assemblage (guest exhibits) Screengrab from Unity VR build, Annihilation Event, 2017 (Louisa Minkin, with permission)

Along the Riverrun, ArtSway, Sway (24.07.17-30.07.17) Curated by Alex Goulden and George Watson

Our evolving assemblage was again reconfigured and augmented for the Along the Riverrun exhibition at ArtSway (10).[9] In Old Minster, 2017 a version of the 'Minster Movie' is played through a tablet incorporated into this artwork, the looping guided tour endlessly returning to its opening frame. The tablet is laid horizontally, and the viewer needs to lean over to see the screen, but the screen has been partially occluded by a scouring pad, on top of which stands a plastic tree. This seemingly ecceletic assemblage recalls an 'archaeological site' prior to excavation; the stratigraphic sequence seemingly lifted whole from the trench and implicating an unseen void of the archaeologist's trench, pre-translation into very mutable mobiles.

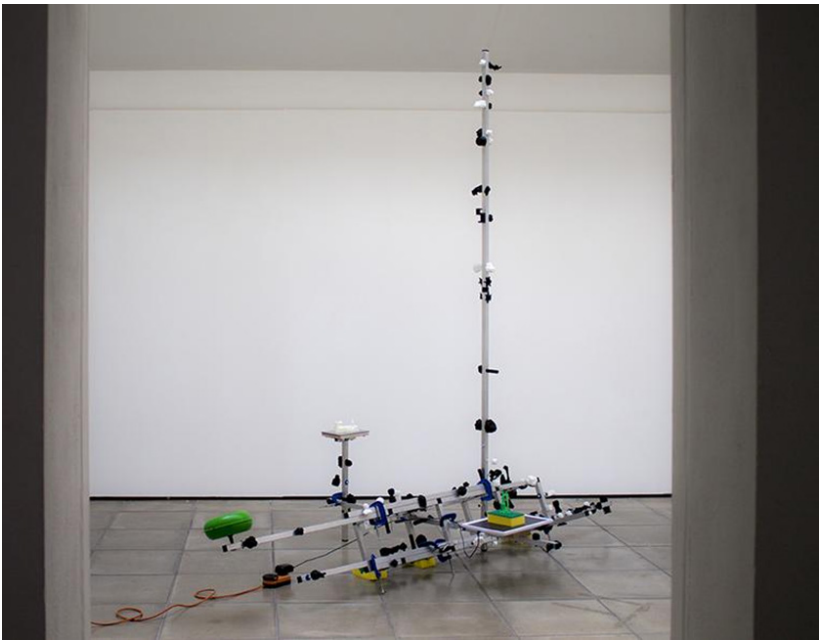


Figure 31: Old Minster, 2017 (Ian Dawson and Paul Reilly, Aluminium, fused filament 3D prints, digital picture frame, scouring pads, G-clamps, dimensions variable)

[9] The TARDIS is a cult British TV Sci-Fi time and space craft that appears much bigger inside compared to its outward appearance and possesses innumerable rooms, corridors and spaces within.

Figure 32: Old Minster, 2017 details (Ian Dawson and Paul Reilly)

Figure 33: “Minster” - Obj with black tone (Paul Reilly and Ian Dawson 2018)

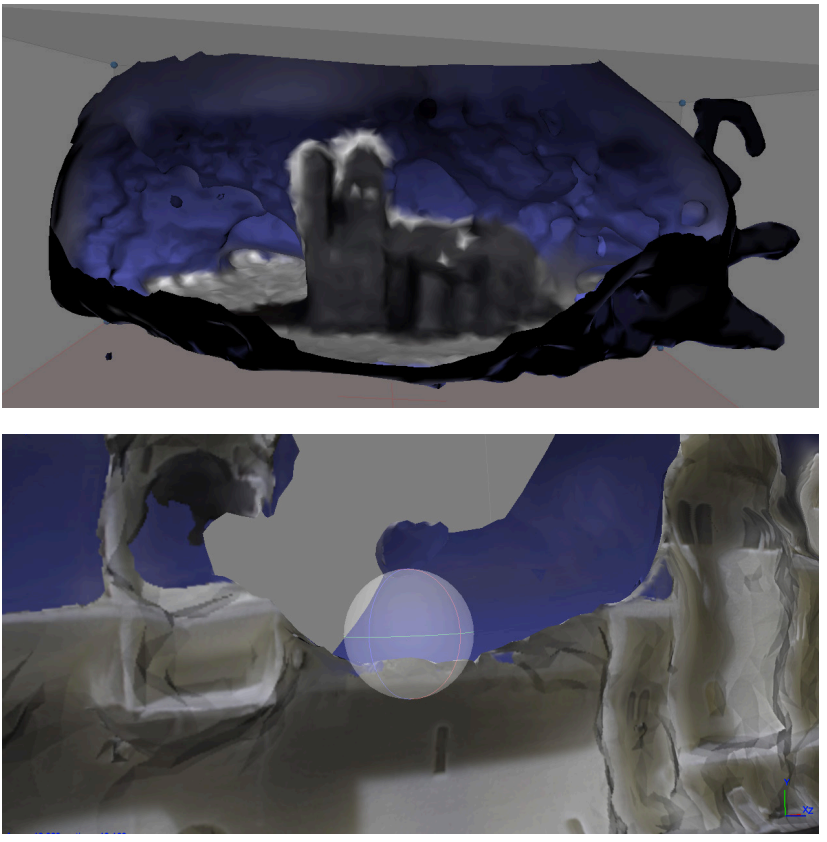


Figure 34: A recursive photogrammetric model reconstructed from meshlab screenshots of previous photogrammetric models

Groock's Gallery, Cyberspace (11.11.18-) Curated by George Peter Thom

Our most recent collaboration is a cyberpunk piece of conceptual art on display in Groock's Gallery. This unique cloud-based VR gallery is housed in a converted digital temple, designed around an archetypal building (that is non-archeological), aimed at contemporary participatory mythological practice in cyberspace (11).[10] In this piece, titled "Minster" - Obj with black tone (Paul Reilly and Ian Dawson 2018), the phygital Old Minster has broken back in to the virtual once again.

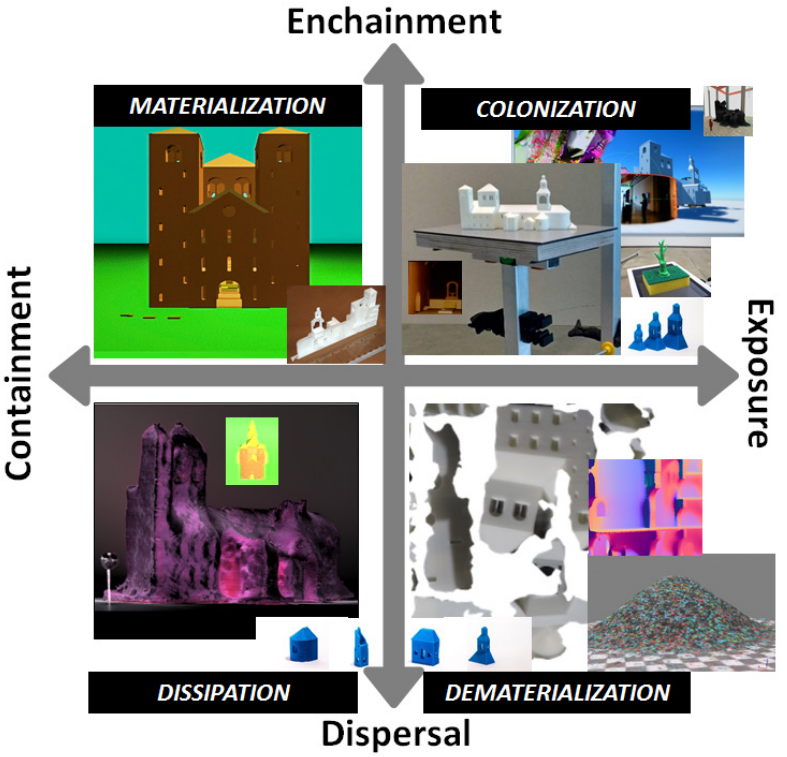


Figure 35: Extending messy ontological assemblage

[10] One portal into Groock's Gallery is: https://robotgroock.wordpress.com/groocks-gallery-free-entry/

Provisional Reflections on a Messy Assemblage

In subverting the phygital nexus, our collage of (im)material art/archaeology has spread across Gavin Lucas' entire assembly versus disassembly grid of forces, with certain elements participating residually or recursively in several, sometimes overlapping, sub-assemblages where their ontological status is not necessarily settled (Figure 35).

Integral to this reflexive collaboration has been the re-imagination of the Saxon Old Minster of Winchester as it may have looked just before it was demolished in CE 1093. In principle, the geometric definition of any assemblage is immutable and may be retained in digital statis indefinitely. One such geometric hypothesis (the digital Old Minster) went into digital stasis in 1984 when the Old Minster was encoded, as it was then interpreted, in Constructive Solid Geometry modelling software. However, subsequent phygital recursions, and their residues, derived from this specific geometric hypothesis, may be significantly less persistent and more mutable when exposed to the forces of (re) materialization, dematerialization, colonization and dissipation. Crucially, time is required to activate this grid of forces. Without time there can be neither movement nor change. Without movement there can be no dislocations, no adjustments of perspective, and no shift in our thinking. Without change there is no entropy, no decay, no erosion, no exposure, and no room for serendipity.

The first materializations of the digital Old Minster were rather fleeting 8-bit VGA resolution static images rendered on specialist hardware, and more or less contained within research laboratories. However, when these digital images rematerialized on photographic film, using analogue cameras, they became somewhat more persistent and decidedly more mobile recursions. These images could now be shared as 35mm slides for projection presentations or as photographic illustrations in articles and posters. Later, further low-resolution recursions were concatenated and transformed into highly choreographed animations that could be transmitted to wider audiences. The introduction of apparent movement into the mix had the side effect of permeating the entire assemblage with time and duration. Time enables new types of relationships to emerge between actants. In particular it causes a subtle, yet profound, shift in the relationship between the artist/archaeologist, the model, and the original prototypes. Adding time, or duration, enables movement which transforms the static geometric description of

a space into an immersive and interactive place that can be explored, and challenges us to think more deeply about how this place might be used. With virtually no fanfare, the first new ontological portal cracked open, allowing a trickle of phygital colonists to emerge, encounter and adapt to new media. We started to think differently about, and with, these newly constructed relational assemblages.

It was the recursive potential of open source that was really the key to opening the floodgates for colonization of the phygital nexus, and exposing the colonists to new ontological possibilities. Applying modern standard off-the-shelf technologies to the transcoded prototype allows 24-bit, high-resolution and interactive screen-based and virtually immersive immaterial recursions, each offering added apparent movement perception and sophisticated lighting arrangements to enrich the experience. In addition, the same open source code can output physical 3D fabricated instantiations which lend additional modalities of exteroception, such as tactile comprehension, on top of the already familiar scopic discourses.

What becomes obvious is that even apparently simple encounters with an instantiation of the phygital Old Minster can never be neutral. They are always complex, mediated, intra-active events. When these instantiations are combined and augmented, as in our featured art/archaeology works, new insights into, and paradoxes within, our practices are added to our extending ontological assemblage as their relational agencies are purposefully articulated and entwined. For example, the conformation of the phygital Old Minster can endure in near perfection in the materialization and colonization recursions we have produced so far. However, that geometric stability is radically compromised when the phygital Old Minster is permeated with time and exposed to the entropic forces of dissipation and dematerialization. Lossyness, digital decay and phygital erosion are a few of the prime protagonists of dissipation we encountered, lurking in the nexus, during this collaboration. For example, every time an instantiation of the phygital Old Minster is compressed or (re)encoded for a new media format, details of the model are progressively, but haphazardly, lost in each successive recursion. Similarly, significant and intriguing differences emerge each time the phygital Old Minster is transformed when a physical instantiation breaks back into the virtual and then returns into the physical world (e.g. photogrammetrically recording a 3D print and then reprinting a new recursion by recapturing the 3D print

through another computational photography intervention). After only one or two cycles, the initial sharply defined edges and vertices of the digital Old Minster seem to melt as its geometry collapses into itself. In exceptional circumstances, even the software model is not entirely immutable and certainly not guaranteed immortality. It too can dissipate if, for example, it is deliberately hacked to produce phygital fragments and form hoards. Of course, the model can also be obliterated if deleted.

However, these fragments, if not contained, will tend to disperse and gradually become more exposed to the force of dematerialization. Once activated, the effects of dematerialisation in the phygital nexus can range from coarse and emphatic to subtle, deceptively beguiling and beautiful. The former is exemplified by the polymer spoil heaps and scaffolding left by the 3D printing process. The latter are encountered in, for example, the ephemeral UV fragments produced as a byproduct of the photogrammetry, and the surreal images that are created as the 'surface' of the phygital Old Minster is totally dematerialized and transformed into a virtual RTI assemblage of strikingly-coloured surface normals. In our featured exhibits, different ontological instantiations (recursions and residues) of the phygital Old Minster have been brought, purposefully, into constellation to confront us with this multiplicity of being, and expose the ontological ambiguities obtained through the plethora of different techniques, transformations and tropes we rely on in the course of our art/archaeology practices.

In conclusion, appearances can be very deceptive. Emerging out of our continuing collaboration is an extending, messy, ontological assemblage. Within it, we include ontological mirages and algorithmic illusions, process-driven scale and shape shifters, chameleon-like skin changers, superficially simple material 3D prints, and 'classic' virtual animated tours; all recursions and residues. However, we have barely scratched its surface so far. This assemblage is not intended to, nor should it, be a static lasting comment on, or an inert record of, our collaboration with the (im)material entities with which we have begun to mix and mingle. Rather, it should be considered as an emerging, dynamic and intra-active conversation involving many actants, some yet to appear. The focus and meaning of this conversation is contingent on the shifting relationships of all actants which unfolds over time. These include our developing intentions as makers (both archaeologist and artist), refracted through our distinct and combined practices, the materials we work with, the application of highly trained

modes of perception and expression, and our instruments of inquiry and presentation. All are agential participants and co-producers in this collaboration. In the case of the RTIs, the signatures of all the main actants and their intra-actions have been auto-archived interstitially as aesthetic paradata within this entangled art/archaeology ontological assemblage.

Acknowledgement

This visual essay is a contribution to a broader set of conversations being held as part of the COST Action (CA15201) 'ARKWORK: Archaeological Practices and Knowledge Work in the Digital Environment[b]'[14]. PR represents the UK as an invited scholar.

References

Bailey, D. (2017) "Disarticulate—Repurpose—Disrupt: Art/ Archaeology", *Cambridge Archaeological Journal*, 27 (4), 691-701. DOI: 10.1017/S0959774317000713.

Barad, K. (2007) *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Duke University Press, London.

Beale, N, Beale, G, Dawson, I. and Minkin, L. (2013) "Making Digital: Visual Approaches to the Digital Humanities", *Journal of Digital Humanities*, 2 (3). Available: http://journalofdigitalhumanities.org/2-3/making-digital-visual-approaches-to-the-digital-humanities/ (Accessed: 22.01.19).

Beale, G. and Reilly, P. (2017) "After Virtual Archaeology: Rethinking Archaeological Approaches to the Adoption of Digital Technology", *Internet Archaeology*, 44. DOI: 10.11141/ia.44.1.

Beale, G., Schofield, J. and Austin, J. (2019) "The Archaeology of the Digital Periphery: Computer Mice and the Archaeology of the Early Digital Era", *Journal of Contemporary Archaeology*, 5 (2), 154-73. DOI: 10.1558/jca.33422.

Bentkowska-Kafel, A., Baker, A. and Denard, H. (eds). (2012) *Paradata and transparency in Virtual Heritage. Digital Research in the Arts and Humanities Series*. Ashgate, Farnham.

Biddle, M. (2018) *The Search for Winchester's Anglo-Saxon Minsters*. Winchester Excavations Committee Publication, Winchester.

Brown, D.H. (1995) "Contexts, Their Contents and Residuality", in: Shepherd, E. (ed.), *Interpreting Stratigraphy* 5 - 1994 Norwich. ISBN 0952631407, 1-8. Available: https://www.york.ac.uk/archaeology/strat/pastpub/95ch1.pdf

Buchli, V. (2015) A*rchaeology of the Immaterial*. Routledge, London.

Carter, M. (2017). "Getting to the Point: Making, Wayfaring, Loss and Memory as Meaning-making in Virtual Archaeology", *Virtual Archaeology Review*, 8 (16). doi:10.4995/var.2017.6056.

Cornell, J. (Director). (1942) *By Night with Torch and Spear*. Available: https://vimeo.com/99334381 (Accessed 14.02.19).

Craig, B. (Ed.). (2008) *Collage: Assembling Contemporary Art*. Black Dog Publishing, London.

Cubitt, S. (2014) The Practice of Light: A Genealogy of Visual Technologies from Prints to Pixels. MIT Press, London.

Dawson, I. (In press) "Dirty RTI", in Back Danielsson, I.M. and Jones, A.M. (eds.) *Images in the Making. Art, process, archaeology*. Manchester: Manchester University Press.

Edgeworth, M. (2014) "From Spade-Work to Screen-Work: New Forms of Archaeological Discovery in Digital Space", pp. 40-58 in Carusi, A., Hoel, A., Webmoor, T. and Woolgar, S. (eds.), *Visualization in the Age of Computerization*. Routledge, London.

Gant, S. and Reilly, P. (2017) "Different expressions of the same mode: a recent dialogue between archaeological and contemporary drawing practices", *Journal of Visual Art Practice*, 17 (1), 100-120. DOI: 10.1080/14702029.2017.1384974.

Graham, S. (2018) 3d models from archival film/video footage. 20th January 2018. Available: https://electricarchaeology.ca/2018/01/20/3d-models-from-archival-film-video-footage/ (Accessed 060219).

Graham, S. (2019) Object Style Transfer, 4th February 2019. Available: https://electricarchaeology.ca/2019/02/04/object-style-transfer/ (Accessed 06.02.19).

Hamilakis, Y. and Jones. A.M. (2017) "Archaeology and Assemblage", *Cambridge Archaeological Journa*l, 27 (1), 77–84. DOI:10.1017/S0959774316000688.

Hofstadter, D. (1979) *Gödel, Escher, Bach: An Eternal Golden Braid.* Basic Books, New York.

Horowitz, J. (1990) Maxell. http://jonathanhorowitz.us/video/maxell/.

Huggett, J. (2017) "The Apparatus of Digital Archaeology", *Internet Archaeology*, 44. DOI: 10.11141/ia.44.7.

Jones, A.M. (2002) *Archaeological Theory and Scientific Practice*. CUP, Cambridge.

Jones, A.M. and Díaz-Guardamino, M, (2019) "Digital Collaborations", pp, 211-213 In: Jones, A.M. and Díaz-Guardamino, M. (eds), *Making a Mark: Image and Process in Neolithic Britain and Ireland*. Oxbow Books, Oxford.

Jones, J. and Smith, N. (2017) "The Strange Case of Dame Mary May's tomb: The performative value of Reflectance Transformation Imaging and its use in deciphering the visual and biographical evidence of a late 17th-century portrait effigy", *Internet Archaeology*, 44. https://doi.org/10.11141/ia.44.9

Joyce, R. and Gillespie, S. (eds.). (2015) *Things in Motion: Object Itineraries in Anthropological Practice*. SAR Press, Santa Fe.

Latour, B. and Woolgar, S. (1986) *Laboratory Life: The Construction of Scientific Facts*, 2nd edition. Princeton University Press, Princeton.

Kjølbye-Biddle, B. and Biddle, M., (forthcoming) *The Anglo-Saxon Minsters of Winchester, Winchester Studies* 4.i, OUP, Oxford.

Loyless, A. (2019). "Visualizing the York Minster as Papercraft" *Epoiesen* http://dx.doi.org/10.22215/epoiesen/2019.3

Lucas, G. (2012) *Understanding the Archaeological Record*. CUP, Cambridge.

Lucas, G. (2017) "Variations on a Theme: assemblage theory", *Cambridge Archaeological Journal*, 27 (1): 187-90.

Minkin, L. (2016) "Out of our skins", *Journal of Visual Art Practice*, 15 (2-3), 116-126. DOI: 10.1080/14702029.2016.1228820.

Moshenka, G. (2014) "The Archaeology of the (Flash) Memory", in: *Notes and News, Post-Medieval Archaeology*, 48 (1), 255-59. DOI: 10.1.179/0079423614Z.00000000055.

Nissen, B. (2014) "Growing Artefacts Out of Making", in: Proceedings of All Makers Now? Craft Values in 21st Century Production, Falmouth University. Available: https://makingdatathings.files.wordpress.com/2015/08/02-amn2014.pdf (Accessed 20 February 2018).

Perry, S. and Morgan, C. (2015) "Materializing Media Archaeologies: The MAD-P Hard Drive Excavation", *Journal of Contemporary Archaeology*, 2 (1): 94–104. https://doi.org/10.1558/jca.v2i1.27083.

Petch, M. (2019) V&A Museum adds Scan the World to Cast Courts Permanent Collection, 3D Printing Industry, 24th January 2019. Available: https://3dprintingindustry.com/news/va-museum-adds-scan-the-world-to-cast-courts-permanent-collection-147822/. (Accessed 25.010.19).

Reilly, P. (1989) "Data visualization in archaeology", *IBM Systems Journal*, 28 (4), 569–579.

Reilly, P. (1992) "Three-dimensional modelling and primary archaeological data", pp. 145–173. in: Reilly, P. and Rahtz, S. (eds.), *Archaeology in the Information Age: A global perspective*. Routledge, London.

Reilly, P. (1996) "Access to Insights: stimulating archaeological visualisation in the 1990s", in: Gedai, I. (Ed.), *The Future of Our Past '93-'95*. Hungarian National Museum, Budapest.

Reilly, P., (2015a) "Palimpsests of Immaterial Assemblages Taken out of Context: Tracing Pompeians from the Void into the Digital", *Norwegian Archaeological Review*, DOI: 10.1080/00293652.2015.1086812.

Reilly, P. (2015b) "Putting the materials back into virtual archaeology", pp 12-23 in: *Virtual Archaeology (Methods and Benefits)*. State Hermitage Publishers, Saint Petersburg.

Reilly, P. (2015c) "Additive Archaeology: An Alternative Framework for Recontextualising Archaeological Entities", *Open Archaeology*, 1(1): 225–235. DOI: https://doi.org/10.1515/opar-2015-0013.

Reilly, P., Todd, S., Walter, A. (2016) "Rediscovering and modernising the digital Old Minster of Winchester", Digital Applications in Archaeology and Cultural Heritage, 3, 33–41. DOI: http://dx.doi.org/10.17613/M66293.

Reinhard, A. (2019b) "Assemblage Theory: Recording the Archaeological Record", *Epoiesen*, http://dx.doi.org/10.22215/epoiesen/2019.1.

Reinhard, A. (2019b) An archaeology of code: Quantitative analysis and context of Colossal Cave Adventure. Available: https://archaeogaming.com/2019/01/06/an-archaeology-of-code-qualitative-analysis-and-context-of-colossal-cave-adventure/ (Accessed 31.01.19).

Shane, J. (2018) Skyknit: When knitters teamed up with a Neural Net. Available: http://aiweirdness.com/post/173096796277/skyknit-when-knitters-teamed-up-with-a-neural (Accessed 30.01.19).

Stiegler, B., (n.d.) Ananmnesis and Hypomnesis. Available: http://arsindustrialis.org/anamnesis-and-hypomnesis (Accessed: 19.01.2019).

Sillman, A., Humphrey, D. and Green, E. (n.d.) team shag. Available: http://hamlettdobbins.com/curating/team-shag-collaborative-works-by-amy-sillman-david-humphrey-elliott-green/ (Accessed 14.02.19).

Stobiecka, M. (2019) "Digital Escapism: How Objects Become Deprived of Matter", *Journal of Contemporary Archaeology*, 5 (2), 194-212. DOI: 10.1558/jca.34353.

Westwood, M. (2011) These Hands are Models. Available: *http://www.stanleypickergallery.org/exhibitions/these-hands-are-models/*.

Virilio, P. (2003) *Unknown Quantity*. Thames and Hudson, London.

Messy Assemblages, Residuality and Recursion within a Phygital Nexus: Response

Rachel Opitz

Citation:
Opitz Rachel 2019. "Messy Assemblages. Residuatity and Recursion, within a Phygital Nexus: First Response". *Epoiesen*.
http://dx.doi.org/10.22215/epoiesen/2019.7

Rachel Opitz is Lecturer in Spatial Archaeometry at the University of Glasgow.
ORCID ID: 0000-0002-5232-1434.

Cover image courtesy of Ian Dawson and Paul Reilly.

Bibliography

Borges, J. L. (1958). *Three versions of Judas*. Mossen: Al cover.

Dawson, I. and Reilly, P. 2019. "Messy Assemblages, Residuality and Recursion within a Phygital Nexus' *Epoiesen* 3.

My initial reaction to Dawson and Reilly's visual essay proposing a phygital nexus was that the authors have, perhaps unconsciously, used the tenets of transubstantiation to try and understand the multiple, physical and digital assembled nature of their phygital objects. Through transubstantiation, word becomes flesh, and blessing and belief turn wine to blood. A messy assemblage of the virtual and physical is at the core of this tenet of the Catholic tradition. If the authors have 'merely' recast transubstantiation into a modem context and are using the idea as a way to think through the relationships between physical and digital things, so what? What does a sincere belief in a modem transubstantiation do for us as archaeologists, artists and thinkers about the material world?

"...reflection on the movement of objects and images within the phygital and, in particular, how different components of assemblages meet, mingle and sometimes experience ontological shifts" (Dawson and Reilly 2019).

Why is this important? If we accept that we, with our modern scientific-logicist Western hats firmly on, struggle to tap into sincere belief in the more-than-material and real dual nature of things - the kind of belief that means that transubstantiation really happens, and that I personally (not my ancestors, but myself) was at Sinai for the giving of the commandments - then we must accept that we are fundamentally blocked from the reality of the experience of the people connected to much of the material world we study. Acceptance of the phygital and exploration of the implications of this concept dissolves, or at least loosens, this blockage and, thanks to the loose trappings of science and technology that hang off the limbs of all things digital, it does so within socially and intellectually acceptable bounds. Sincerely engaging with the phygital better aligns us with the ontologies of the assemblages we study.

Our modem, Western, scientifically oriented slice of society is perhaps rather unusual in that it lacks a sincere belief in a transubstantiation-like phenomenon. It is, perhaps, this lack of faith in things outside the bounds of logic that drives a fascination with the phygital and transformations within it. The phygital is alluring precisely because it provides an opportunity, within the framework of scientific modernity, to connect with the mystical or spiritual, or at least with the more-than-physical. In creating a phygital nexus, as the authors do with Winchester Minster, they effectively become priests or tme believers, with the heady power to invoke a

"In Asia Minor or in Alexandria, in the second century of our faith, when Basilides disseminated the idea that the cosmos was the reckless or evil improvisation of deficient angels, [he] would have directed, with singular intellectual passion, one of the Gnostic conventicles.... Instead, God afforded [him] the twentieth century and the university town of Lund." - *The Three versions of Judas* (Borges 1958).

Figure 15 from Dawnson and Reilly

"A phygital nexus can be thought of as a no-place and an everyplace in which the boundaries between what is physical and what is virtual are blurred, where digitally-defined objects (actants) are susceptible to transmutations and may be (re)deposited within multiple parallel or intersecting physical and digital assemblages (e.g. Reinhard 2019a), and are able to 'jump' almost anywhere in our digitally hyper-connected universe. In addition, phygital objects can be invoked, instantiated and brought into constellation with other practices (1) and entities both physical and virtual, and 'messy1 assemblages can, and do, emerge from these interventions. Phygital transformations, moreover, may be multi-directional: digital objects can become physical and, conversely, material instantiations can be virtualised." (Dawson and Reilly 2019).

Bibliography
Miéville, C. (2009). *The City & the City.* London: Macmillan.

Dawson, I. and Reilly, P. 2019. "Messy Assemblages, Residuality and Recursion within a Phygital Nexus' *Epoiesen* 3.

"Interstiality is a theme that is simultaneously genuinely interesting and potentially quite useful, and also a terrible cliche, so if you're going to use it, it helps to be at least respectfully skeptical about the wilder claims of its theoretical partisans, I think."

"Unseeing, of course, but I could not fail to be aware of all the familiar places I passed grosstopically,"

-The City and the City (Miéville 2009)

These ideas of *Dissipation and colonization, Recursiveness and residuality*, and Gavin Lucas' assembly versus disassembly grid of forces are taken collectively as a means of describing and investigating the processes and im/materialisations of bringing things together and observing what is left behind, and of things breaking apart and what is left behind. They are the tools for understanding what happens ontologically speaking when something is picked up and transposed wholesale from one context to another. Following the ontological rules of the phygital, these processes work across two imperfectly separated realms, which operate under partially shared rules. This permeable situation affords opportunities to create new hybrid entities.

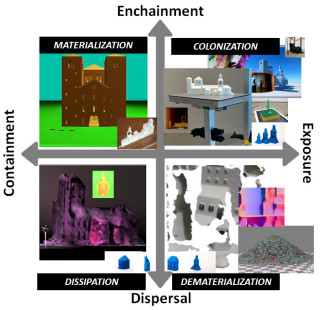


Figure 35 from Dawson and Reilly 2019

"to investigate the tension between the forces of assembly versus disassembly. Lucas' focus of attention is firmly on the tension between the processes of (re)materialization and dematerialization…. Colonization and dissipation also have vital roles to play within assemblages…" (Dawson and Reilly 2019)

I have suggested in this response to Dawson and Reilly (2019) that the phygital gives permission to engage sincerely with ideas of transubstantiation and glitching between realms. In parallel, I suggest that artistic practice, for an archaeologist, similarly gives permission to work outside the strict bounds of contemporary western scientific ontologies, and to play the glass bead game "for keeps". It's fitting, therefore, that the exploration of these ideas takes the form of an artistic collaboration that is defining and playing by its own rules.

The key in the thinking presented here is that objects are not only physically, spatially, materially and temporally itinerant, but ontologically itinerant. The authors imply that ontological wandering is inherent to the other forms of movement. Mutation and glitching are brought in as unintentional ontological transformation mechanisms, cutting across the physical and digital. That the meaning of an object changes dependent on its context is a truism, but inflected into the realm of the phygital, which implies repeated transformation as part of the character of the realm, it becomes an inherent and central property of being a phygital thing.

This kind of ontological assemblage, a semi-structured mixing of meanings built on an ethos of collaborative interchange and development and shaped by playing the game of 'yes, and', resonates with the logic of assemblages generated through talmudic argumentation. Commentaries and conversation across time, place, and frames of reference co-exist on the phygital page. In these contexts, it is perfectly possible to debate, as if in person, someone long dead. One may even win the argument.

The Hunt for Bincknoll Chapel and the Public Archaeology Twitter Conference 3

Katy Whitaker

Citation:
Whitaker, Katy. 2019. "The Hunt for Bincknoll Chapel and the Public Archaeology Twitter Conference 3". *Epoiesen*. DOI: http://dx.doi.org/10.22215/epoiesen/2019.8

Katy Whitaker is a doctoral researcher at the University of Reading.
ORCID ID: 0000-0002-9391-8181.

Cover image courtesy of Katy Whitaker

Introduction

The theme of the third Public Archaeology Twitter Conference ('PATC3', 30/31 January 2019) was Archaeology as Storytelling, and I leapt at the opportunity to be involved. Within moments of reading the conference Call for Papers, I knew what I wanted to do: I would present a paper in the form of an archaeological comic, telling a story about a community excavation in Wiltshire (UK) that I was involved in during 2014/15. This Epoiesen article is my artist's statement on that archaeological comic. The comic may be viewed on Twitter beginning at this tweet dated January 31st 2019.

Context

The 2018 Call for Papers said it all. "The very real excitement that can surround archaeology, for both archaeologists and members of the public, is often blurred or overwhelmed by the detail and time involved in... long and unwieldy reports, neglected archives and delayed or drawn-out projects. Creating a story out of your work can be challenging..."

My mind flew to archaeological artist, illustrator, and comic-maker John Swogger and his 2015 paper "Ceramics, Polity and Comics. Visually re-presenting formal archaeological publication." Published in Advances in Archaeological Practice, this paper embodies John's challenge to archaeologists: that we must tackle the "visual wasteland" of archaeological publication by harnessing the unique story-telling powers of comics to communicate complex information. Furthermore, John's effective adaptation of a peer-reviewed journal article from American Antiquity into comic format shows that it is possible to apply this visual structure, compositional language, and communication

techniques, to formal, professional, presentation of archaeological data and interpretation.

This leads to the second part of the PATC3 Call for Papers. The conference aim was to explore "if a conference of archaeological stories, based on archaeological evidence, can both engage participants and transmit archaeological knowledge in a way that does not dilute the science and rigour behind the narrative." Could I do this in a comic, as John's demonstration suggests is possible, but also within the conference constraint of no more than 12 tweets?

Concept

I wrote my abstract, 175 words of traditional proposal for a paper titled "The Lost Chapel of Bincknoll". It illustrates where my mind's eye was in 2018:

The Lost Chapel of Bincknoll

This paper is a re-visioning of two excavation reports published in 2015 and 2016 in a county archaeology journal: inspired by John Swogger's transformation of a peer-reviewed paper in American Antiquity into a comic that brings text and image into closer relationship, and using comics' design elements to foreground sequence and narrative.

The reports describe and interpret the investigation over two excavation seasons of the remains of a small medieval building in north Wiltshire. The fieldwork was a collaborative community project between Broad Town Archaeology and the Wiltshire Archaeology Field Group. It also involved members of the Young Archaeologists' Club. The two published papers are traditional, formal, excavation reports, full of interest and illustrated by accompanying images.

I now re-present the excavation results in comic form, taking advantage of the form of a tweet (analogous to a comic panel, in which image and text can be integrated) and Twitter's threading functionality (analogous to the sequence of panels in a comic) to tell the story of the lost chapel of Bincknoll.

#BincknollChapel #PATC3

That twin affordance of Twitter referred to in the abstract's last paragraph, to combine image and text in an immediate, small, enclosed,

easily-read space (i.e. a tweet), and to story-tell through a thread (of linked tweets), was the burning lightbulb at the heart of my idea. But I intended not simply to make a comic comprised of panel drawings shared via the maximum number of images that I could display in 12 tweets (48, assuming four images posted per tweet). My original concept relied on Twitter's intimate relationship between tweeted text and a tweet's image.

When I access Twitter via my laptop, and click on an image posted in a tweet, something great happens. The image opens and is fully-revealed, and the text of the tweet appears in a ribbon over the bottom edge of the image. A comic panel is formed.

As John writes, "Our world is shaped by media which do not separate or segregate image and text, but bring them together." Twitter is set up to integrate image and text in this way. A dynamic relationship is created between the image and text, through both the physical movements that I have made operating my laptop and also the programming that causes the tweet text to move from above the image, as it appears in a Twitter user's timeline, onto the image itself.

My original concept intended to take advantage of this by posting twelve images with twelve 'captions'. When delegates participating

Tweet 2/12

in PATC3 would click on the image in one of my conference paper's tweets, they would activate this functionality that places the tweet text over the opened image. This was not intended to be simply another comic posted on Twitter: it was meant to be a Twitter comic.

Making

The 2014/15 excavations at Bincknoll, a hamlet in rural north Wiltshire (UK), were published in two papers in the Wiltshire Archaeological and Natural History Magazine (Clarke and Sanigar, 2015; Clarke and Elton, 2016). In the first digging season, I and a volunteer team of adult leaders had taken a small group of Young Archaeologists' Club members on a day visit to the site. During the second season we were on site for a whole week, responsible for excavating and recording one of the trenches over the building remains that were being uncovered. I began my conference preparations by re-reading the two reports, remembering my experiences on site, and calling on the principal site director, Bob Clarke, for additional photographs.

Allowing for tweet 1/12 to be the comic title page, and tweet 12/12 for the credits, enabled me to budget ten tweets to tell the story of the excavation and its main conclusion: that the building foundations we had uncovered in the front garden of a small cottage were the remains of a medieval chapel. This I story-boarded, deciding which were the key archaeological details that must be included to substantiate the published interpretation of the site. This was an important consideration, bearing in mind the conference Call for Papers requirement to "transmit archaeological knowledge in a way that does not dilute the science and rigour behind the narrative".

It was then a simple matter to draw up the first draft of the twelve panels, decide which worked and which did not, and make changes to the less effective panels. These changes included abandoning an idea to illustrate the title page with portraits of the key site staff; and sticking to less human-scale, but simpler, overhead views of work on site and site plans, rather than drawing oblique images that would have been more like the view experienced by a visitor in person.

I regret losing the portraiture: but the community excavation was very collaborative and included so many significant people that it was difficult for me to compose into a legible image the dozen-or-so 'headshots' required around the comic title. Also, I just wasn't skilled enough

to draw believable caricatures beyond the three or four people I knew best. This personal touch was thus absent. The friendly and caring landowners, the morning and afternoon tea-breaks with home-made cake, the accommodating and supportive archaeologists: these relationships that made the project are missing from the comic. Relying on overhead views (tweets 3/12, 5/12, 7/12, 9/12, 10/12) was less troublesome to me, and a pragmatic decision to do with time. I couldn't find a photograph to given me precisely the angle on site that I wanted, and there wasn't enough time for me to sketch and re-sketch a panel to get this right without recourse to a shot from the site photo record. Again, skills (or, lack thereof).

For visual and structural uniformity across the twelve tweets, I cut out a cardboard template to define each panel border. The rectangular, landscape-oriented template had rounded corners to mirror the format of images in a Twitter timeline. That gave me a thick black line to delimit each panel. When you click on a tweeted image, however, it opens and those rounded corners are lost as the whole image is revealed. This meant that I needed to include a white border around each panel frame; conveniently providing me with additional visually-helpful white space on screen.

Tweet 1/12

I draw my comics up on layout paper first. Layout paper is lightweight and semi-transparent, for the artist to cut bits up and move around a design, trace from, and generally get their work in order. With twelve panels marked out using the cardboard template, I drew the story.

The revised title page (tweet 1/12) now included a scene-setting image, placing the title The Hunt for Bincknoll Chapel at the foot of the wooded hill on which stands the earthwork remains of Bincknoll Castle. This establishes both spatial and temporal context: the excavation was at the foot of the hill, and the story is set in the present day as we investigate archaeological evidence together. The conclusion (tweet 11/12) replicated this scene, but now placing us in the past: the castle on the hill is reconstructed and the chapel can be seen below, with a quote from the excavation report giving us the headline finding – that the dig had found the remains of Bincknoll's manorial chapel.

Tweet 11/12

Three tweets (2/12 to 4/12) provide the cultural resource management context. Unexpectedly, archaeological remains had been uncovered in a domestic setting; the County Archaeologist was involved; and community groups comprised of a mixed membership undertook the excavation. Now that so few people would appear in the

comic, it was important to me to establish the human and personal genesis and conduct of the project as best I could. Using only the landowners' first names, for example, is both personalising and, in part, a security choice (although anyone can, through the published reports, fully identify them to invade their privacy if so minded).

The key archaeological findings underpinning the site interpretation are the building plan, size, and orientation, and the artefacts recovered from contexts within the footprint delimited by the foundations. Additionally, historical research identified the few records of a long-lost ecclesiastical building at Bincknoll. Tweets 5/12 to 10/12 provide this information that underpins the excavators' conclusions. Rather than mimicking the excavation reports' structure, in which individual trenches are described and separate finds reports are made, the comic is structured chronologically. It reflects the discovery and ongoing questioning and answering – the hermeneutic cycle of the project – in my attempt to recover some of that "very real excitement that can surround archaeology" and "both engage participants and transmit archaeological knowledge" mentioned in PATC3 call for papers.

With re-draws of two of the panels easily completed on layout paper and pasted over their failed originals, I could then trace off the twelve panels ready for scanning.

In the meantime, I had realised that my original concept, the 'Twitter comic' in which panels comprise an image overlain by text derived from the tweet, would not work. I had been tinkering with Twitter on different devices. I'm lucky to have a smart phone, a tablet, and a laptop. With my comic in mind, I had been paying more attention to how images work on the social media platform. It was only on my laptop that tweeted text displayed in a ribbon at the bottom of an opened image. On my phone and tablet, an opened image was accompanied by only the 'reply', 'retweet', 'like', and 'tweet activity' symbols. What devices would the conference delegates be using to participate and view papers? I couldn't draw only the images, leaving a space for the planned tweet text to fall into: each panel would have to include any required text. This is why tweets 2/12 to 11/12 include my hand-written caption. Although there is a visual consistency throughout – except tweet 8/12 where I was able to bring in the idea of historical documentary evidence by marrying text with a scroll form – this immediately set up accessibility problems, and of course removed the original concept at a stroke.

Tweet 8/12

Reflection

On the whole the conference paper seemed to be well-received with plenty of likes and re-tweets of individual panels and even some compliments: by some of my existing followers but also conference delegates, other archaeologists and archaeological illustrators, and a few people who, if their Twitter profiles are anything to go by, don't identify with heritage in any explicit way. Mostly, I got what I wanted from the experience: a test of my skills to condense the technical excavation reports into a more engaging and definitely briefer narrative; and some conference conversation about comics and, in archaeological illustration more widely, issues around interpretive uncertainty, and technical and illustrative style, and how the artist makes choices about what to depict in an image, and how to depict it.

In terms of wider engagement, the PDF version of the paper that I posted to the Humanities Commons CORE has been downloaded 63 times (as of 16 August 2019). To my great surprise, however, the paper later became one of the discussion points in Matthew Edwards' 'zine *A Reflection on the Third Public Archaeology Twitter Conference*. The 'zine is Matthew's final submission for a seminar directed by Dr

Shawn Graham at Carleton University, Ottawa (Canada): he chose to analyse and interpret data about PATC3 to explore to what extent the conference met its aims, and what issues there are around this form of public engagement. Matthew pointed out things about my paper, that I had not fully appreciated myself, such as the way that my retention of archaeological conventions of the aerial photograph, site plan, and interpretative plan created an "archaeological mood" which "encourages her audience to connect her narrative to previous experience with archaeology". Hopefully, those conventions lent some gravitas or rigour to my simple black and white line style and condensed account of the excavation.

On the other hand, did I take too much for granted the readers' knowledge of archaeological practice? Laurel Rowe points out in these pages that the reader of a comic must fill the gaps between each panel, imagining the missing action on the basis of the intimations made visually by the artist. How much does reading my comic rely on having an awareness of archaeological processes, likely sequences of work and action on site? As Laurel mentions, the chronological structure is an affordance of the comic medium. As events unfolded for the archaeologists and the archaeology, so the story unfolds for the reader scrolling from tweet to tweet, looking from panel to panel. Is the 'reveal' of the next tweet like the turn of the printed page, or of the trowel in the earth? Mediated by Twitter, the comic struggles to use many of the visual compositional strengths that are possible on the page such as breaking across the gutter.

The principal failure of the paper was in not being what I have been calling a Twitter comic. I could not deliver my original concept, because different devices display tweeted images and their tweet text differently. This then set up a series of accessibility issues for me, which I did not deal with adequately. With captions hand-written into each panel, I could no longer rely on functionality like screen-readers to deliver the words to participants. To my shame, I hadn't allowed time to deal with this: I hadn't prepared Alt Text for each posted image, and I didn't use a running commentary tweet-to-tweet either, to repeat the panel text. I have remedied this in a small way in the online PDF at Humanities Commons, by including Alt Text and checking the resulting file for its accessibility score.

There are a few small errors in the drawings. For example, in my haste, I mis-understood an aspect of the interpretation of the eastern

end of the building which has an impact on the interpretative plan in tweet 10/12. Although I had asked the principal site director, Bob Clarke, for his permission to adapt the two site reports, I didn't approach the Wiltshire Archaeological and Natural History Society (of which I am a member) in advance. That would have been polite, at the very least. If I was doing this over, I would allocate more time to discussing the idea with stakeholders and preparing the comic panels to be as accessible as I could make them.

It's a shame that I can't link from the comic to the full published reports, because the county archaeology journal is produced only in analogue format. Next time, I'd want to make the comic a little less like an excavation report by including more human-scale images, oblique views, and the people involved in making the project the enjoyable experience that it was for all ages. Apart from my voice, the voice of the excavation report authors dominate this comic. What would the voices of the chapel builders and worshippers look like?

Twelve tweets for a conference paper of this nature enabled me to deliver a very limited interpretation of the excavation and site. There were other finds that I didn't draw (like lead window cames), other archaeological activities that I didn't depict (like photography and other recording methods), many other people are missing. But then maybe this short and engaging version of the story is all that most readers need? After all, who is going to read this comic? I don't think any more than two or three of the other people involved in the project on the ground will see it, and they have their own memories and value to take from the experience. For everyone else in the Twitterverse, maybe my little comic is all that they need to find out what happened when we went on the hunt for Bincknoll Chapel.

References

Clarke, B. and Sanigar, J. (2015) The Lost Chapel of Bincknoll, Broad Town, north Wiltshire: an interim report on excavations at Binckoll Cottage 2014. *Wiltshire Archaeological and Natural History Society Magazine* 108, 133-142

Clarke, B. and Elton, E. (2016) The Lost Chapel of Binckoll, Broad Town, north Wiltshire: final report on excavations at Bincknoll Cottage 2015. *Wiltshire Archaeological and Natural History Society Magazine* 109, 126-142

Rowe, Laurel. 2018. "Contains Scenes of a Graphic Nature: Sympathy for the Devil". *Epoiesen*. DOI: http://dx.doi.org/10.22215/epoiesen/2018.5

Swogger, J.G. (2015) Ceramics, Polity, and Comics: Visually Re-Presenting Formal Archaeological Publication. *Advances in Archaeological Practice* 3(1), 16-28. DOI: https://doi.org/10.7183/2326-3768.3.1.16