European Journal of Archaeology 22 (3) 2019, 324–337

Avatars, Monsters, and Machines: A Cyborg Archaeology

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As digital practice in archaeology becomes pervasive and increasingly invisible, I argue that there is a deep creative potential in practising a cyborg archaeology. A cyborg archaeology draws from feminist posthumanism to transgress bounded constructions of past people as well as our current selves. By using embodied technologies to disturb archaeological interpretations, we can push the use of digital media in archaeology beyond traditional, skeuomorphic reproductions of previous methods to highlight ruptures in thought and practice. I develop this argument through investigating the avatars, machines, and monsters in current digital archaeological research. These concepts are productively liminal: avatars, machines, and monsters blur boundaries between humans and non-humans, the past and the present, and suggest productive approaches to future research.

Keywords: digital archaeology, posthumanism, digital media, practice, cyborg archaeology

Introduction

Writing about the representation of prehistoric humans, Diane Gifford-Gonzalez (1993: 26) states that artists are mining arcane knowledge to make simulacra or 'science fictions' of archaeological evidence. The overt implication of this is that we are making fanciful, unreal representations of past things, people, and places when producing archaeological interpretations. Yet Gifford-Gonzalez is riffing on Donna Haraway (1989: 3), who notes that 'both science and popular culture are intricately woven of fact and fiction'—which share the same Latin root, *facere*, to make. Facts, Haraway states, are descendants of the past participle (*factum*), done, unchanging, 'fit only to be recorded'—as in artefacts—whereas '*fiction* is an active form, referring to a present act of fashioning' (Haraway, 1989: 4) as in the act of interpretation, of storytelling. Following Gifford-Gonzalez and Haraway, I am not stating that archaeological interpretation is not true, but that it has the immense potential to be *true*, to resonate with all the passion and fire of science fiction novels, movies, or comic books. I posit that science fictions allow the past and present to become permeable through the creation of a shared interstitial space. Prefiguring archaeological interpretations as 'science fiction' is liberating but also demanding. Our present acts of fashioning fall far short of expanding the understanding of humans in compelling and potentially disturbing ways. Haraway elaborates on Marilyn Strathern: 'It matters what ideas we use to think other ideas (with)' (Strathern, 1988, 12 in Haraway, 2016). This article is an experiment in trying out different ways to think with digital archaeology, to acknowledge our science fictions, to disturb our genre. *To make trouble*.

© European Association of Archaeologists 2019
doi:10.1017/eaa.2019.22
Manuscript received 13 December 2018,
accepted 11 April 2019, revised 26 February 2019

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

The digital has become pervasive, tedious, and worryingly invisible in archaeological labour, embedded in the craft of archaeological knowledge production. Digital work in archaeology is so ubiquitous that it has recently led Huvila to state: 'there is no digital archaeology' (Huvila, 2018: 1). This may be true. While this article focuses on digital archaeology, much of the argument can be applied more broadly, to most acts of archaeological interpretation. On the surface, digital archaeology is defined by the tools and methods employed in the investigation and interpretive display of the past. This can foster a sense of remove from the processes embedded in the use of digital technologies; non-reflexive use of digital interpretive media in archaeology has been increasingly criticized in recent literature (Frankland, 2012; Perry, 2014; Jeffrey, 2015; Huggett, 2017; Morgan & Wright, 2018). Whereas many seek to seamlessly embed digital technologies into everyday archaeological methodologies, archaeologists should cultivate an alternative, posthuman feminist practice that dives into the uncanny valley, highlights chronological disruptions, that queers and interferes with our understanding of ourselves and the past.

Posthumanism has been lauded and digested by other disciplines, decades ago, but the patina of rust on the cyborg is, in my estimation, ready for archaeological investigation. Hayles (1999: 2–3) characterizes posthumanist thought as disembodied, an amalgamated material-informational entity with shifting boundaries, aching towards a seamless articulation with artificial intelligence. She then recontextualizes posthumanism as understanding human life as 'embedded in a material world of great complexity', deeply embodied and removed from liberal humanism and anti-human conceptualizations of the self (Hayles, 1999: 287). This is a political, grounded, embodied engagement with technology. Similarly, Haraway's 'Manifesto for Cyborgs' (1985) is an explicitly political call to attend to socialist feminism and materialism within digital ecologies. Braidotti extensively and productively elaborates on the posthuman, combining Foucauldian genealogies with feminist politics to examine entangled power relations and 'produce grounded and complex cartographies of the posthuman condition' (Braidotti, 2016: 15–16; also Braidotti, 2013).

Within archaeology, feminist posthumanism has been described by Christina Fredengren (2013: 55) as questioning anthropocentrism, using embodied subject positions to address power, ethics, and accountability, and encompassing the full range of human experience to work for a more sustainable future. Fredengren constructs a compelling case that feminist posthumanism 'can alter the arguments about identity, personhood and subjectivity and, thereby, make room for an increased interchange between science and the humanities in archaeology' (Fredengren, 2013: 66). She further argues for the importance of posthumanist approaches in heritage to emphasize how 'agents can be mobilized in productive ways as well as how heritage resources could be used to de-colonize, learn and unlearn, entangle and detangle practices' (Fredengren, 2015: 127). While arguments regarding object-oriented-ontologies and symmetrical archaeology have received more attention, Fredengren's mobilization of feminist posthumanism to create a holistic approach to archaeological interpretation is key for digital archaeologists who actively engage in a cyborg practice of integrating human and non-human elements into their media. So, it was perhaps a misstep, when Stuart Eve and I (Morgan & Eve, 2012) wrote, 'we are all digital archaeologists'—an easy strapline to cite, diminish, and

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

move on from—when the suggestion of a cyborg archaeology may have encouraged engagement with our intent: an embodied, political, activist digital archaeology.

A Cyborg Archaeology

I argue that there is deep creative potential in aligning with a cyborg archaeology. A cyborg archaeology draws from feminist posthumanism to transgress bounded constructions of past people as well as our current selves. By using embodied technologies, we can push interpretation in archaeology beyond traditional, skeuomorphic reproductions of previous methods (as discussed in Morgan & Wright, 2018) to highlight ruptures in thought and practice. One of the most powerful potentials within a cyborg archaeology is the ability to make a viable interstitial space where material expression from the past and present can co-mingle in commensurate space (Figure 1). A cyborg archaeology is a practice in worlding, in Heidegger's (2010) sense of being-in-the-world, but also as world-building in science fiction and video game creation. From this stance, creating archaeological interpretations is endlessly immersive, a process that I have compared to telepresence, 'where you are when you are talking on the phone' (Rucker et al., 1992). While immersed in archaeological interpretation, you are not completely in the present, but also not wholly in the past, but inhabit an interstitial space (Morgan, 2009, 2012). This resonates with Fredengren's (2013: 59) use of the concept of the transcorporeal to understand the blurred boundaries between the human body, places, and things.

A cyborg archaeology acknowledges that our bodies are dividual, 'weedy and promiscuous' (Haraway, 1991, 1995), and the perceived boundaries between

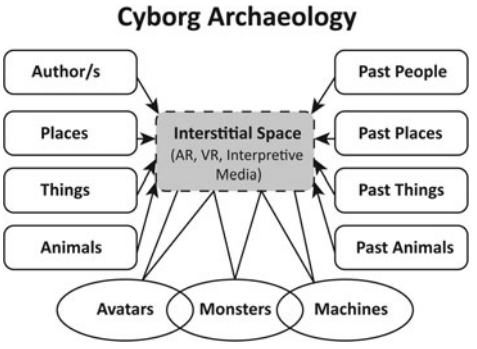

Figure 1. *Cyborg archaeology.*

machines and humans, nature and culture, and the present and past are inevitably permeable. Virtual and augmented reality can provide a meeting ground where digital materiality defines all subjects, thus allowing transgression of these perceived boundaries. A cyborg archaeology integrates the body, the author of the interpretation. As Hayles notes, 'we do not leave our history behind but rather, like snails, carry it around with us in the sedimented and enculturated instantiations of our pasts we call our bodies' (Hayles, 2003: 137). Yet the body is only one component of the holistic interpretation. A cyborg archaeology weaves together ontologies of humans, animals, and things, bioarchaeologies investigating ancient gut flora, and digital flows and transformations. By contrast, a digital archaeology creates stand-alone 3D reconstructions, floating endlessly in grey space.

In this article, I present current research in troubling the embodied encounter with the past, wherein the digital de-naturalizes and disturbs our assumptions about shared experiences with past people while simultaneously transgressing our bounded construction of our current selves. I develop this argument through investigating the avatars, machines, and monsters as productively inhabiting this interstitial space. I argue that a cyborg archaeology can

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

Figure 2. *Ruth Tringham's avatar.*

productively comment on the posthuman in archaeology.

Avatars

The OKAPI Island in Second Life reconstruction of Çatalhöyük (2007–2011) was created by a team of students, academics, and technical staff from the University of California, Berkeley, to explore the outreach and interpretive potential of online virtual worlds (Morgan, 2009; Tringham, 2012). The focus was initially on reproducing Neolithic and modern-day architecture alongside displays featuring other multimedia interpretations of Çatalhöyük. Yet during the first online open day, 'meeting' the avatars of the far-flung participants in the real-world excavation of Çatalhöyük around a virtual campfire proved to be one of the most compelling aspects of the virtual reconstruction. Users of avatars in virtual worlds are more fully immersed when their bodies 'feel right' and allow them to 'construct, express, and perform the identity they are seeking' (Taylor, 2002: 52). Some users feel as though their avatars are 'truer' reflections of themselves, as '"more them" than their corporeal body' (Taylor, 2002: 54). This sense of identification did not necessarily imply that the avatars looked anything like the users controlling them; project director Ruth Tringham's avatar had green skin (Figure 2), a trait that she was loath to lose, even when asked to change to a more Neolithic shade for a machinima (a movie within a virtual world). Yet Ruth's avatar represented her in-world self so evocatively that she started using the representation in other media, for lectures and on her Facebook wall. Accordingly, when students and staff took on Neolithic avatars to create machinima, there was dissonance between their understanding of their corporeal bodies, the avatars that reflected their mode of expression within the virtual world, and the foreign Neolithic avatars. Most changed back immediately after filming in-world.

To contrast with other 3D reconstructions of Çatalhöyük that present a quiet, immersive, genteel, depopulated Neolithic, the use of avatars to navigate OKAPI Island provided a chaotic, dissonant experience that was uncomfortable and occasionally hilarious. Avatars inhabited an interstitial space (Figure 1), a meeting ground between the corporeal body of the user and the remains of Neolithic people of the past. Use of these avatars

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highlighted the tendency within archaeology to phenomenologically interpret the past as a modern, able-bodied, same-gendered, normative reflection of ourselves. Avatars can radically interfere with our assumptions about the use and navigation of space in the past. During the 2010 field season, I excavated Building 79 at Çatalhöyük and subsequently created a 3D reconstruction of it in Second Life. A building that felt relatively spacious during excavation felt cramped and claustrophobic when trying to move through the space with my avatar; I then became convinced that the excavations at Çatalhöyük were primarily investigating the Neolithic equivalent of *basements*, fundamentally shifting my previous understanding of these as primary living spaces. Though these explorations were extremely productive, research regarding avatars and virtual archaeology has unfortunately languished, even as new potential within the realm has intensified.

A cyborg archaeology incorporates the embodied representation of the author or user into interpretations. The case study of avatars dwelling in the Çatalhöyük reconstruction on OKAPI Island reveals the importance of embodied interpretation in virtual reconstructions, to challenge static, isolated, uncanny, and authorless 3D representations of archaeological remains (Morgan, 2009). Since the closing of OKAPI Island, 3D models have proliferated in archaeology but there are few with any representations of humans or an embodied way to explore these models. Tringham (1991a) provided an early critique of this remove as a 'dehumanized and normatized view of archaeological architecture' that does not take into account the perspectives of 'different prehistoric actors who are of different age, gender, power, and life history' (1991a: 23; see also Joyce & Tringham, 2007). Even fewer 3D models allow persistent dwelling, though archaeologists are increasingly exploring virtual embodiment (Champion, 2008), some through the phenomenological exploration of video games (Reinhard, 2017, 2018). Yet the impulse remains; as Pujol-Tost notes, there is a clear desire amongst archaeologists to create 'immersive, populated, fully interactive environments that reproduce the multisensory dimension of the world' (Pujol-Tost, 2017: 2).

Technology and research regarding avatars have moved rapidly, including greater optical fidelity, affinity with avatars with mirrored gestures, quick-creation of life-like avatar faces, but also revealing greater attachment and empathy through the use of avatars. For example, recent research has shown that changing the virtual race of a user's avatar can increase empathy and reduces implicit racial bias against people of colour (Hasler et al., 2017). Significantly for archaeologists, researchers are increasingly looking to virtual reality to allow people to take on the perspective of groups that are outside the experience of the user. Bringing together the demonstrable impacts of eliciting understanding and empathy through cultural heritage and through avatars of past people could have a significant influence on perceptions of the past. The stakes are higher when these life-like representations are based on specific evidence such as ancient DNA, isotopic analyses, and other bioarchaeological information.

These converging technologies have the potential both to significantly alter our interpretation of past landscapes and to reconfigure our understanding of ourselves as bounded, modern people. The animation of past people is fraught with complex questions of ethics and identity, tied to diverse ideas regarding the treatment and display of human remains, the depiction of past people, and potential adverse effects of taking on the embodied

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experience of another person. This is further complicated by the wide range of possibilities involving augmented reality. At the most complex (and hereto purely science fiction) end of this range, wearable technologies could allow a fully reconstructed person to look in the mirror and not see themselves but a past person looking back. The other end of the spectrum could be a geolocated auditory augmented reality that suggests the physical qualities of navigating the space with the bodily affordances of a past person. Though the specific manifestations may be highly diverse, archaeologists must consider the full implications of our resurrections, paying particular attention to feminist posthumanist ethical practice. What are our responsibilities to the people of the past?

Digital reconstruction through avatars is an aggressive re-personalization, an occupation of a dead body. At the same time our construction of the person is acting back upon us, forcing us to consider the landscape and experience the world through bodies different from our own. Through avatars we become distributed people with multiple subjectivities (Turkle, 1997). An engagement with cybernetic posthumanism within digital archaeology and virtual reconstruction would both temper technological determinism and specifically inform our embodied manifestations of archaeological interpretations and growing reliance on screen-work as archaeology (Edgeworth, 2014). Further, we can move away from presentist constructions of archaeology and acknowledge the porous nature of the past and present in our work.

Monsters

A cyborg archaeology has the synaesthesia of the monster; when brought to digital archaeology, an embodied, emplaced, multisensory experience can profoundly disturb, but also resonate. We accidentally stumbled on this monstrous quality with Voices Re/Cognition, a 2014 Heritage Jam project. A team including Stuart Eve, Colleen Morgan, Alexis Pantos, Sam Kinchin-Smith, Kerrie Hoff, and a remotely-present Shawn Graham created the prototype for an aural augmented reality mobile application (Morgan, 2015; Graham et al., 2019a). This app aurally emphasized visibly 'empty' spaces in York Cemetery, showing them to be full of unmarked graves, and gave 'voices' and stories to individual tombstones. Yet these voices all spoke at the same time. Entering the cemetery was like opening the door of a raucous house party. The volume of each 'voice' was determined by the user's proximity to the tombstone, like leaning into to overhear groups of people engaged in conversation. Successful ventures into cyborg interpretation should not be a seamless, transhuman integration of machine and body to transmit ideas about the past, but should invoke a monstrous disruption, interfering with both our understanding of the past and current sense of self.

Monsters, in their sensuous, ambivalent in-betweenness, can be an expression of creative impulse, subversion, or evidence of play within archaeology. In their examination of the queer potential of the monstrous, Jones and Harris (2016) reject the homogenization and mainstreaming of LGBTQI+ narratives and embrace complication and unintelligibility. In a parallel publication, I discuss a queer digital archaeology inspired by subversive acts of *détournement*, comics, 3D reconstructions, and video games (Morgan, forthcoming). To creatively transgress within archaeology is delightful. While working at Leskernick Hill, the Stone Worlds surveyors created wooden house doorways to determine

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view-sheds, which required 'people walking over to the other huts, standing on the walls and becoming the huts themselves…everyone was rolling around with laughter at the madness of it all (Bender et al., 2007: 53, noted in Eve, 2014: 97). In our work on the Media Archaeology Drive Project (MAD-P), we found the application of archaeological methods to examine a computer hard drive 'the best kind of mischief', reconfiguring our research and challenging our preconceptions (Perry & Morgan, 2015: 101). For example, using standard archaeological conventions, such as recording sheets and scale drawings, to document digital media forced us to consider and record digital textures, negative and positive features, and examine icons in exquisite detail. Play is an underrated but deeply important part of creative digital practice in archaeology.

There is also resonance within Shawn Graham and colleagues' (2019b) work on productive failure within digital archaeology, to experiment and play without punishment and improve resilience for building a better understanding during the next iteration. For digital archaeological practitioners, failure is a default position: to experiment with new technology and to use it in an unorthodox fashion is to fail spectacularly and repeatedly. For every seamless and verisimilar 3D fly-through presentation (or 2D screenshot reproduced within traditional publication), there is a vast digital graveyard of failed projects. The fragility of digital outputs within archaeology is relatively well documented (see Law & Morgan, 2014, among others), and teaching these technologies leaves an astonishing wreckage of half-realized models, broken databases, and drone videos of grass and boots. The important lesson is to document the paradata (Denard, 2012), to reveal the monstrous underbellies of our virtual realities, failed and fully realized.

Cyborg archaeology is a practice in worlding, bringing together digital representations of past and present people, places, and things. Creating presence requires a multisensorial engagement with these representations. Angela Piccini (2015), in a productive discussion of multisensorial worlding that comes from enacting the material-discursive practice through gesture and moving image, notes that the world of archaeology on television is fashioned and transmitted through pointing, touching, contact; the edits create 'an archaeologist-material-landscape assemblage where the boundaries between each are practised through the abstraction and reconfiguration of multiple, indistinct bodies that resolve as human and non-human, but do not emphasize the ontological separation of the two' (Piccini, 2015: 65). Tringham's (2013) multisensory digital archaeology emphasizes haptics to create the present-past Neolithic in Turkey. She aimed to confound and enhance the body's haptic experience by playing with virtual touch, layering realities by introducing a 'real world' audio and video guide into the virtual space of the Second Life reconstruction of Çatalhöyük (Tringham, 2013). Similarly, Eve (2014, 2018) introduces 'The Dead Man's Nose', a simple set-up that allowed the emplacement of various smells from Bronze Age Britain in 'smell-zones', activated by proximity. Champion notes that 'new forms of kinaesthetic and sensory perception do not even need to be human in origin' (Champion, 2008: 196), allowing us to proceed as *monsters*, mingling our senses with plants, animals, artefacts, and architecture.

This confounding of senses is echoed in Hayward's (2010) haptic-optic 'finger-eyes' designation. Hayward coined the term in her multispecies ethnographic research on cup corals and scientists at the Long Marine Laboratory at Santa Cruz in

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California to understand the 'tentacular visuality of cross-species encounters and to name the synaesthetic quality of materialized sensation'. She cites the 'in-between of encounter, a space of movement, of potential…the transfer of intensity, of expressivity in the simultaneity of touching and feeling (Hayward, 2010: 580 and 581). This is particularly important to meaningful interpretation in archaeology. Hayward refers to Howes' (2005: 7) concept of *emplacement*, 'the sensuous interrelationship of body-mind-environment', to which she adds 'an attention to texture, animation, galvanizing drives… we are embodied in relation to the world' (Hayward, 2010: 592). Using fingeryeyes to augment and decentre the engagement within archaeological investigation and interpretation had a tentative beginning in transhuman interventions such as Chrysanthi and colleagues' (2016) use of personal video recording devices (GoPros) during excavation, or Witmore's (2004) peripatetic video, but these could be further elaborated on. These interventions highlighted the archaeological gaze and added another interpretive layer to excavation and survey, but did not manage to profoundly change the perception of the viewer or the archaeologist.

I have used the term monster to describe synaesthetic interventions into digital archaeology, but the term also evokes a sense of difference, of *other*. Monsters 'represent the in between, the mixed, the ambivalent…[the] horrible and wonderful, object of aberration and adoration' (Braidotti, 1997: 62). Digital interventions are Frankenstein's monsters, lurching somewhere between Tringham's 'faceless blobs' (1991b) and an idealized ontological collective—networked and multi-faceted but still oddly homogenous. Archaeological monsters are a human and unhuman aggregate, one that digital archaeologists should recognize as we practise assembling 'articulations among cosmos, animal, human, machine, and landscape in their recursive sidereal, bony, electronic, and geological skeletons' (Haraway, 1992: 329). A cyborg archaeology does not create stand-alone interventions but contributes to a collective reimagining of past and present, and of ourselves.

Machines

While I have emphasized the contextual, embodied, and sensory aspects of a cyborg archaeology, we must also attend to the machines. Technoscience, a 'mutation in historical narrative' (Haraway, 1997: 4), describes the shift in the relationship between science and technology from mechanical to digital, encompassing the 'heterogeneous actors in the co-construction of science, technology and society' (Prasad, 2017: 1). Initial adoption of digital technology within archaeology could be characterized as contributing towards a transhuman archaeology, using science and technology to overcome our perceived human limitations: a 'rapture of the nerds' (Sirius & Cornell, 2015). This manifests across archaeology, while recording—in our labs, in our socialization, during publication—a map that is the size of the Empire (Borges, 1998). 'Paperless' archaeology, millions of digital archaeological photographs, and instantaneous communication through email, text, and tweets are adopted as transparent, obvious wins in the battle of efficient workflows. Technonormativity abounds. But archaeologists are increasingly acknowledging the properties of digital methods and how these are changing interpretation and dissemination within the field (Perry 2014; Beale & Reilly, 2017; Huggett, 2017; Huvila, 2018; Morgan & Wright, 2018; Opitz, 2018; Jones & Diaz-Guardamino, 2019).

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Machines are implicated in interpretation within archaeology, from the use of punch cards (Tringham, 2010; Květina & Končelová, 2013) to various permutations of artificial intelligence including agent-based modelling, machine learning, and natural language processing. Barceló (2007) posits an automatic archaeology performed by a cognitive robot that solves archaeological problems using mathematics and visual models. New opportunities for the examination and integration of big datasets offer new perspectives on the traditional 'grand challenges' of archaeology such as mobility, movement, and migration (Kintigh et al., 2014; Bevan, 2015; Crema et al., 2017). Artificial intelligence in archaeology and heritage is also becoming apparent in the creation of chatbots, 'conversational robots designed to mimic human interaction—with varying degrees of success' (Graham et al., 2019b). Chatbots can be used to broadcast archaeological information on Twitter: for example, Flinders' head (https://twitter.com/tinyflinders) tweets excerpts from Flinders Petrie's diaries. Chatbots can also be used to interact online with heritage audiences (Tzouganatou, 2018).

Beyond digital tools changing the way archaeology is practised and aiding interpretation and dissemination, there is a broader context of using archaeology to understand technoscience. Assessments of the Anthropocene have framed a discussion of the dense materiality of late capitalism, termed 'the technosphere' (Zalasiewicz et al., 2017). When evaluating the heft of our accumulated technology, Zalasiewicz and colleagues estimated the accumulated materials in which a human component can be identified as weighing 30 trillion tonnes. This is 'five orders of magnitude greater than the weight of the standing biomass of humans' sustained by this infrastructure (Zalasiewicz et al., 2017: 19). Edgeworth (2018) relates archaeology to the 'technosphere' through the 'archaeosphere', which he defines as: 'what gets left behind in the ground when the technosphere ceases to work, consisting of no-longer functioning parts and residues which have become buried' (Edgeworth, 2018: 26). This recalls the discussion regarding the wreckage of digital projects, the skeletons of our monsters buried in e-waste graveyards.

In these discussions of the materiality of the technosphere, there is a missing data layer that, ironically, can be characterized by a project: TechnoSphere. TechnoSphere was a virtual world inhabited by user-generated artificial life forms, created by Jane Prophet and Gordon Selley in 1995 (Prophet, 1996, 2001). These artificial life forms ate, grew and developed, died, and passed on their genes. The project is no longer online, it ran from 1995 to 2002, then again from 2007 to 2012; arguably it has become part of the digital archaeosphere, with the only surviving remains in journal articles and low-resolution screenshots. The livestock of the data layer, their algorithmic genes, must be recovered from dead drives and data formats. Attending to the machines entails a holistic examination of the entire entity: the hardware, the software, and the human creator and operator.

A contemporary archaeology of the digital is underway. Finn's (2002) formative 'excavation' of Silicon Valley and survey of computer collections (Finn, 2003) proved to be productive archaeological investigations of what was already becoming 'retro-tech'. During routine work, Moshenska (2014) conserved and documented a USB drive that contained a media assemblage that reflected the everyday life of a young man. Sara Perry and I (Perry & Morgan, 2015) 'excavated' a hard drive by surveying its contents and disassembling the drive into its component parts, finding the translation of formal

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archaeological recording methods to an unorthodox context illuminating and decentring. Finally, Reinhard's (2017) research on archaeological investigations of the video game as a built environment and forthcoming investigations of the archaeology of algorithms provides an understanding of the software infrastructures too often constructed as ephemeral. As archaeologists, we are beginning to examine the machines, making them visible so that we can understand how they shape our thinking and how we co-construct almost every aspect of our experience.

Conclusions

Gavin Lucas described the archaeological cyborg as 'never just a person but always a person with or as part of a larger assemblage of other things—measuring tapes, pencils, cameras, trowels, and so on' (Lucas, 2012: 239). I have extended this definition considerably by incorporating theory drawn from posthumanist feminism to encourage a creative, generative digital archaeology. The larger assemblage of the archaeological cyborg includes digital tools that can extend authorship into an interstitial space where the dead can interfere with interpretation. Digital archaeology is not so much the creation of efficiencies or a rupture in practice as it is a series of potentials. This article outlines only a few of them. Avatars bring authorship and presence to interpretations and can provide non-normative perspectives informed by the biological affordances of past people. Walking around OKAPI Island as an avatar led me to different conclusions regarding the function of the rooms I had excavated. Monsters assemble humans, non-humans, animals, places, and things into multisensory digital phantasmagoria, allow failure, incite play, and invite subversion. Haunting York Cemetery with digital voices revealed that the visually empty plots of land held multitudes of unknown dead. Machines are our co-authors, our playground, the under-examined skeleton, and the chattering emulators. Excavating a hard drive made us rethink archaeological methodology, and how space might be understood and constructed in the future. Whether or not the neologism of a cyborg archaeology has any traction is immaterial; through examining the avatars, monsters, and machines of digital archaeology, I have populated an interpretive interstitial space between the past and the present. In our future archaeological science fictions, we have these companion species to help us assemble our interpretations.

The future of digital archaeology will probably continue to be skeuomorphic—360° digital live capture of archaeological excavations, better 3D printing, more detailed virtual reconstructions, and insights from big data manipulated by increasingly complex algorithms are all likely candidates and are worthy of investigation. I hope that there will always be room for multisensorial interpretations that compromise boundaries, for playful failure, and non-technonormative projects that threaten traditional understandings of the past.

References

Barceló, J.A. 2007. Automatic Archaeology. In: S. Cameron & F. Kenderdine, eds. *Theorizing Digital Cultural Heritage*. Cambridge (MA): MIT Press, pp. 437–56.

Beale, G. & Reilly, P. 2017. Digital Practice as Meaning Making in Archaeology. *Internet Archaeology*, 44: 62.

Bender, B. 2007. *Stone Worlds: Narrative and Reflexivity in Landscape Archaeology*. Walnut Creek (CA): Left Coast Press.

Bevan, A. 2015. The Data Deluge. *Antiquity*, 89: 1473–84.

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

Borges, J.L. 1998. *Collected Fictions* (trans. by A. Hurley). London: Penguin.

Braidotti, R. 1997. Mothers, Monsters, and Machines. In: K.C.N. Medina, N. Medina & S. Stanbury, eds. *Writing on the Body: Female Embodiment and Feminist Theory*. New York: Columbia University Press, pp. 59–79.

Braidotti, R. 2013. *The Posthuman*. Cambridge: Polity.

Braidotti, R. 2016. Posthuman Critical Theory. In: D. Banerji & M.R. Paranjape, eds. *Critical Posthumanism and Planetary Futures*. New Delhi: Springer India, pp. 13–32.

Champion, E.M. 2008. Explorative Shadow Realms of Uncertain Histories. In: Y. Kalay, T. Kvan & J. Afflect, eds. *New Heritage: New Media AND Cultural Heritage*. London: Routledge, pp. 185–206.

Chrysanthi, A., Berggren, Å., Davies, R., Earl, G.P. & Knibbe, J. 2016. The Camera 'at the Trowel's Edge': Personal Video Recording in Archaeological Research. *Journal of Archaeological Method and Theory*, 23: 238–70.

Crema, E.R., Bevan, A. & Shennan, S. 2017. Spatio-temporal Approaches to Archaeological Radiocarbon Dates. *Journal of Archaeological Science*, 87: 1–9.

Denard, H. 2012. A New Introduction to the London Charter. In: A. Bentkowska-Kafel, H. Denard & D. Baker, eds. *Paradata and Transparency in Virtual Heritage*. London & New York: Routledge, pp. 57–71.

Edgeworth, M. 2014. From Spade-work to Screen-work: New Forms of Archaeological Discovery in Digital Space. In: A. Carusi, A. Sissel Hoel, T. Webmoor & S. Woolgar, eds. *Visualization in the Age of Computerization*. London: Routledge, pp. 40–58.

Edgeworth, M. 2018. More Than Just a Record: Active Ecological Effects of Archaeological Strata. In: M.A. Torres de Souza & D. Menezes Costa, eds. *Historical Archaeology and Environment*. Cham: Springer, pp. 19–40.

Eve, S. 2014. *Dead Men's Eyes: Embodied GIS, Mixed Reality and Landscape Archaeology* (BAR British Series 600). Oxford: Archaeopress.

Eve, S. 2018. Losing our Senses, an Exploration of 3D Object Scanning. *Open Archaeology*, 4: 114–22. https://doi.org/10.1515/opar-2018-0007

Finn, C. 2002. *Artifacts: An Archaeologist's Year in Silicon Valley*. Cambridge (MA): MIT Press.

Finn, C. 2003. Bits and Pieces: A Mini Survey of Computer Collecting. *Industrial Archaeology Review*, 25: 119–28.

Frankland, T. 2012. A CG Artist's Impression: Depicting Virtual Reconstructions Using Non-photorealistic Rendering Techniques. In: A. Chrysanthi, P. Murrieta Flores & C. Papadopoulos, eds. *Thinking Beyond the Tool: Archaeological Computing and the Interpretive Process* (BAR International Series 2344). Oxford: Archaeopress, pp. 24–39.

Fredengren, C. 2013. Posthumanism, the Transcorporeal and Biomolecular Archaeology. *Current Swedish Archaeology*, 21: 53–71.

Fredengren, C. 2015. Nature–Cultures: Heritage, Sustainability and Feminist Posthumanism. *Current Swedish Archaeology*, 23: 109–30.

Gifford-Gonzalez, D. 1993. You Can Hide, But You Can't Run: Representations of Women's Work in Illustrations of Palaeolithic Life. *Visual Anthropology Review: Journal of the Society for Visual Anthropology*, 9: 22–41.

Graham, S., Eve, S., Morgan, C. & Pantos, A. 2019a. Hearing the Past. In: K. Kee & T.J. Compeau, eds. *Seeing the Past with Computers: Experiments with Augmented Reality and Computer Vision for History*. Ann Arbor (MI): University of Michigan Press, pp. 224–36.

Graham, S., Gupta, N., Smith, J., Angourakis, A., Reinhard, A., Ellenberger, K., et al. 2019b. The Open Digital Archaeology Textbook [online] [accessed 7 March 2019]. Available at: <https://o-date.github.io/draft/book/index.html>

Haraway, D. 1985. A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s. *Socialist Review*, 80: 65–108.

Haraway, D. 1989. *Primate Visions: Gender, Race, and Nature in the World of Modern Science*. New York & London: Routledge.

Haraway, D. 1991. *Simians, Cyborgs, and Women*. New York & London: Routledge.

Haraway, D. 1992. The Promises of Monsters: A Regenerative Politics for Inappropriate/d

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

Others. In: L. Grossberg, C. Nelson & P.A. Treichler, eds. *Cultural Studies*. New York: Routledge, pp. 295–336.
Haraway, D. 1995. Cyborgs and Symbionts: Living Together in the New World Order. In: C. Hables-Gray, ed. *The Cyborg Handbook*. New York: Routledge, pp. xi-xx.
Haraway, D. 1997. *Modest_Witness@Second_Millennium. FemaleMan©_Meets_Onco Mouse™: Feminism and Technoscience*. New York: Routledge.
Haraway, D. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham (NC): Duke University Press.
Hasler, B.S., Spanlang, B. & Slater, M. 2017. Virtual Race Transformation Reverses Racial In-group Bias. *PloS One*, 12: e0174965. https://doi.org/10.1371/journal.pone.0174965
Hayles, N.K. 1999. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago & London: University of Chicago Press.
Hayles, N.K. 2003. Afterword: The Human in the Posthuman. *Cultural Critique*, 53: 134–37.
Hayward, E. 2010. Fingeryeyes: Impressions of Cup Corals. *Cultural Anthropology: Journal of the Society for Cultural Anthropology*, 25: 577–99.
Heidegger, M. 2010. *Being and Time* (ed. by D.J. Schmidt, trans. by J. Stambaugh). Albany (NY): State University of New York Press.
Howes, D. 2005. Introduction. In: D. Howes, ed. *Empire of the Senses: The Sensual Culture Reader*. London: Berg, pp. 1–17.
Huggett, J. 2017. The Apparatus of Digital Archaeology. *Internet Archaeology*, 44. https://doi.org/10.11141/ia.44.7
Huvila, I., ed. 2018. *Archaeology and Archaeological Information in the Digital Society*. Abingdon & New York: Routledge.
Jeffrey, S. 2015. Challenging Heritage Visualisation: Beauty, Aura and Democratisation. *Open Archaeology*, 1. https://doi.org/10.1515/opar-2015-0008
Jones, A.M. & Diaz-Guardamino, M. 2019. Digital Collaborations. In: A.M. Jones & M. Diaz-Guardamino. *Making a Mark: Image and Process in Neolithic Britain and Ireland*. Oxford: Oxbow, pp. 211–15.
Jones, S.H. & Harris, A. 2016. Monsters, Desire and the Creative Queer Body. *Continuum*, 30(5): 518–30.
Joyce, R.A. & Tringham, R.E. 2007. Feminist Adventures in Hypertext. *Journal of Archaeological Method and Theory*, 14: 328–58.
Kintigh, K.W., Altschul, J.H., Beaudry, M.C., Drennan, R.D., Kinzig, A.P., Kohler, T. A., et al. 2014. Grand Challenges for Archaeology. *Proceedings of the National Academy of Sciences of the United States of America*, 111: 879–80.
Květina, P. & Končelová, M. 2013. From Punch Cards to Virtual Space: Changing the Concept of Archaeological Heritage Management in the Digital Age. In: P.F. Biehl & C. Prescott, eds. *Heritage in the Context of Globalization: Europe and the Americas*. New York: Springer, pp. 95–101.
Law, M. & Morgan, C. 2014. The Archaeology of Digital Abandonment: Online Sustainability and Archaeological Sites. *Present Pasts*, 6: 1–9.
Lucas, G. 2012. *Understanding the Archaeological Record*. Cambridge & New York: Cambridge University Press.
Morgan, C. 2009. (Re)Building Çatalhöyük: Changing Virtual Reality in Archaeology. *Archaeologies*, 5: 468–87.
Morgan, C. 2015. Punk, DIY, and Anarchy in Archaeological Thought and Practice. *AP: Online Journal in Public Archaeology*, 5: 123–46. https://doi.org/10.23914/ap.v5i0.67
Morgan, C. forthcoming. The Queer and the Digital: The Politics of Archaeological Representation. In: C. Blackmore & M. Springate, eds. *Queering the Past*. London: Routledge.
Morgan, C. & Eve, S. 2012. DIY and Digital Archaeology: What Are You Doing to Participate? *World Archaeology*, 44: 521–37.
Morgan, C. & Wright, H. 2018. Pencils and Pixels: Drawing and Digital Media in Archaeological Field Recording. *Journal of Field Archaeology*, 43: 136–51.
Moshenska, G. 2014. The Archaeology of (Flash) Memory. *Post-Medieval Archaeology*, 48: 255–59.
Opitz, R. 2018. Publishing Archaeological Excavations at the Digital Turn. *Journal of Field Archaeology*, 43(supplement): S68–S82.
Perry, S. 2014. Crafting Knowledge with (Digital) Visual Media in Archaeology. In: R. Chapman & A. Wylie, eds. *Material Evidence: Learning from Archaeological Practice*. London: Routledge, pp. 189–210.

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

Perry, S. & Morgan, C. 2015. Materializing Media Archaeologies: The MAD-P Hard Drive Excavation. *Journal of Contemporary Archaeology*, 2: 94–104.

Piccini, A. 2015. 'To See What's Down There': Embodiment, Gestural Archaeologies, and Materializing Futures. *Paragraph*, 38: 55–68.

Prasad, A. 2017. Introduction: Global Assemblages of Technoscience. *Science, Technology and Society*, 22: 1–5.

Prophet, J. 1996. Sublime Ecologies and Artistic Endeavors: Artificial Life and Interactivity in the Online Project 'TechnoSphere'. *Leonardo*, 29: 339–44.

Prophet, J. 2001. TechnoSphere: 'Real' Time, 'Artificial' Life. *Leonardo*, 34: 309–12.

Pujol-Tost, L. 2017. '3D·CoD': A New Methodology for the Design of Virtual Reality-mediated Experiences in Digital Archeology. *Frontiers in Digital Humanities*, 4. https://doi.org/10.3389/fdigh.2017.00016

Reinhard, A. 2017. Video Games as Archaeological Sites: Treating Digital Entertainment as Built Environments. In: A.A.A. Mol, C.E. Ariese-Vandemeulebroucke, K.H.J. Boom & A. Politopoulos, eds. *The Interactive Past: Archaeology, Heritage & Video Games*. Leiden: Sidestone Press, pp. 99–106.

Reinhard, A. 2018. *Archaeogaming: An Introduction to Archaeology in and of Video Games*. New York: Berghahn Books.

Rucker, R.v.B., Sirius, R.U. and Queen Mu 1992. *Mondo 2000: A User's Guide to the New Edge*. New York: Harper Perennial.

Sirius, R.U. & Cornell, J. 2015. *Transcendence: The Disinformation Encyclopedia of Transhumanism and the Singularity*. San Francisco (CA): Red Wheel Weiser.

Strathern, M. 1988. *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia*. Berkeley (CA): University of California Press.

Taylor, T.L. 2002. Living Digitally: Embodiment in Virtual Worlds. In: R. Schroeder, ed. *The Social Life of Avatars: Presence and Interaction in Shared Virtual Environments*. London: Springer, pp. 40–62.

Tringham, R. 1991a. Men and Women in Prehistoric Architecture. *Traditional Dwellings and Settlements Review*, 111: 9–27.

Tringham, R. 1991b. Households with Faces: The Challenge of Gender in Prehistoric Architectural Remains. In: J. Gero & M. Conkey, eds. *Engendering Archaeology: Women and Prehistory*. Oxford: Basil Blackwell, pp. 93–131.

Tringham, R. 2010. Forgetting and Remembering the Digital Experience and Digital Data. In: D. Boric, ed. *Archaeology and Memory*. Oxford: Oxbow Books, pp. 68–105.

Tringham, R. 2012. The Public Face of Archaeology at Çatalhöyük. In: R. Tringham & M. Stevanovic. *Last House on the Hill: BACH Area Reports from Çatalhöyük, Turkey*. Los Angeles (CA): Cotsen Institute of Archaeology Press, pp. 503–35.

Tringham, R. 2013. A Sense of Touch: The Full-Body Experience in the Past and Present of Çatalhöyük, Turkey. In: J. Day, ed. *Making Senses of the Past: Toward a Sensory Archaeology*. Carbondale (IL): Southern Illinois University Press, pp. 177–95.

Turkle, S. 1997. Multiple Subjectivity and Virtual Community at the End of the Freudian Century. *Sociological Inquiry*, 67: 72–84.

Tzouganatou, A. 2018. Can Heritage Bots Thrive? Toward Future Engagement in Cultural Heritage. *Advances in Archaeological Practice*, 6: 377–83.

Witmore, C.L. 2004. Four Archaeological Engagements with Place Mediating Bodily Experience Through Peripatetic Video. *Visual Anthropology Review: Journal of the Society for Visual Anthropology*, 20: 57–72.

Zalasiewicz, J., Williams, M., Waters, C.N., Barnosky, A.D., Palmesino, J., Rönnskog, A.S, et al. 2017. Scale and Diversity of the Physical Technosphere: A Geological Perspective. *Anthropocene Review*, 4: 9–22. https://doi.org/10.1177/2053019616677743

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https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press

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Avatars, monstres et machines : une archéologie cybernétique

Avec la généralisation des pratiques numériques en archéologie, qui deviennent cependant de plus en plus imperceptibles, l'auteur soutient qu'il existe un vaste potentiel de créativité dans la pratique de l'archéologie cybernétique. Cette discipline s'inspire du posthumanisme féministe pour briser les limitations de nos préconceptions sur les gens du passé mais aussi sur nous-mêmes. L'emploi de technologies incorporées et de médias numériques en archéologie nous permet de dépasser les limites des reconstitutions traditionnelles et skeuomorphiques produites par des méthodes plus anciennes, de bouleverser nos interprétations et de mettre l'accent sur certains points de rupture dans la pensée et en pratique. L'auteur traite ce sujet à travers l'examen d'avatars, de machines et de monstres tels qu'on les représente de nos jours en archéologie numérique. Ces concepts, liminaires mais productifs car les avatars, les montres et les machines brouillent les frontières entre ce qui est humain et non-humain et entre le passé et le présent, nous permettent d'entrevoir des approches fructueuses en recherche. Translation by Madeleine Hummler

Mots-clés: archéologie numérique, posthumanisme, médias numériques, pratique, archéologie cybernétique

Avatare, Monster und Maschinen: eine Cyborg-Archäologie

Als sich die Digitalisierung in der archäologischen Praxis durchsetzt und zunehmend unsichtbar wird, wird hier der Standpunkt vertreten, dass die Ausübung der Cyborg-Archäologie potenziell sehr kreativ sein könnte. Die Cyborg-Archäologie ist vom feministischen Posthumanismus beeinflusst und bietet die Möglichkeit, unsere beschränkten Vorstellungen der Menschen in der Vergangenheit aber auch von uns selbst zu überwinden. Mithilfe der verkörperten Technologien und Digitalmedien in der Archäologie können wir die Grenzen der traditionellen, skeuomorphischen Rekonstruktionen der älteren Methoden überschreiten, archäologische Deutungen stören und gewisse intellektuelle und praktische Bruchstellen aufzeigen. Dies wird hier anhand von Untersuchungen von Avataren, Maschinen und Monstern in der gegenwärtigen digital-archäologischen Forschung herausgearbeitet. Solche liminale aber produktive Auffassungen, weil die Avatare, Maschinen und Monster die Grenzen zwischen dem Menschlichen und Nicht-Menschlichen und zwischen der Gegenwart und der Vergangenheit verwischen, stellen vielversprechende Ansätze für weitere Forschungen dar. Translation by Madeleine Hummler

Stichworte: digitale Archäologie, Posthumanismus, Digitalmedien, Praxis, Cyborg-Archäologie

https://doi.org/10.1017/eaa.2019.22 Published online by Cambridge University Press