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Reverse engineering and the archaeology of the modern world

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Zitiervorschlag

Angela A. Piccini. 2016. Comment on Gabriel Moshenska: Reverse engineering and the archaeology of the modern world. Forum Kritische Archäologie 5:45-47.

URI http://www.kritischearchaeologie.de/repositorium/fka/2016_5_7_Piccini.pdf
DOI [10.6105/journal.fka.2016.5.7](https://doi.org/10.6105/journal.fka.2016.5.7) ; <http://dx.doi.org/10.17169/refubium-45931>
ISSN 2194-346X



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Comment on Gabriel Moshenska: Reverse engineering and the archaeology of the modern world

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Gabriel Moshenska sets out an argument for the utility of applying the theories and practices of “reverse engineering” to archaeological work. Reverse engineering involves taking objects apart in order to understand the design processes that were in play to create the object. Within contemporary industrial production reverse engineering allows product replication. When a product comes to market, competitors can reverse engineer it in order to design their own versions. It is, therefore, a key practice of market competition. In this article Moshenska is interested in the ways in which reverse engineering might reveal some of the human and more-than-human messiness of these processes, in the never-smooth tacit knowledges at play. His contention is that similarities in the aims, methods and intended outcomes of archaeology and reverse engineering make it a productive space in which to work with and understand, in particular, modern technological artefacts.

It is always useful for disciplines to open up new avenues in which to think otherwise about their questions and materials. Archaeology has been the focus of multiple minor conceptual thefts across the arts and humanities that either marginalize archaeology as “mere” digging or hijack its material practices altogether in the mapping of genealogies. Moshenska seeks to work through other possibilities for archaeology, and he frames familiar examples from Science and Technology Studies (STS) in terms of re-introducing the agency of specific, individual humans to moribund stories of techno-scientific modernity. Specifically, Moshenska echoes the focus of STS scholarship when he argues for the utility of approaching archaeological analysis through reverse engineering, arguing that such an approach reveals ‘the specific and frequently idiosyncratic mechanisms through which the technologies of modern society operate’ (p. 18).

Moshenska points towards Lucy Suchman’s pioneering work that emerged out of her long career at Xerox in California. In *Plans and Situated Actions: The Problem of Human-machine Communication* (1987), Suchman detailed the entangled relationships between humans and other-than-humans in her case study analysis of the design and installation of a large, interactive photocopier. Suchman contests the planning model of action and design to argue that plans are “formulations of antecedent conditions and consequences of action, which account for action in a plausible way” (1987: 4). However, Suchman critiques the underlying logic of reverse engineering as she suggests that “plans systematically ignore the necessary *ad hocness* of situated action in favour of an account of the action as in accord with the plan” (4). While he concludes his paper on a more optimistic note, Moshenska himself raises doubts early on about the abilities of reverse engineering to illuminate the *ad hoc* and situated action of people in production processes (p. 17).

While I had not before considered contemporary industrial archaeology in the specific context of reverse engineering, and while I can recognize its potential as method, I was left with several questions as I read Moshenska’s discussion. If the application of reverse engineering is to reconstruct production processes and to explore the connections between humans and other-than-humans in those processes, then I am unsure why this is best applied to “modern technological artefacts such as vehicles, computers and industrial machinery” (p. 17). If no corner of the contemporary landscape, from Blackfriars Bridge in London to the Cowley Business Park in Oxford (Penrose 2010) to the remotest forests of northern British Columbia, is untouched by industrialization and deindustrialization, why restrict reverse engineering only to artefacts such as vehicles, computers and industrial machinery? Moreover, with the tantalizingly brief question in the section on the Avro Vulcan as to whether artefacts might be considered sites, might reverse engineering itself not be extended to consider the interpolation of these modern technologies and their associated sites to question where and how the boundaries between the two are enacted?

If, as Moshenska argues, reverse engineering's focus on "re-constructing the function of obsolete technology or technologies for which the documentation has been lost...describes the entire archaeological record" (p. 19), then is he simply arguing for it to be adopted as method for all archaeologies of the contemporary world? As Penrose argues in her paper on Cowley, "archaeological memory becomes a methodology for materialising; for materialising that which escapes us" (ibid: 176). Reverse engineering as an archaeological memory practice holds the potential to do this, certainly. Yet, do we run the danger of having to all be reverse engineers now (*pace* Holtorf 2015)? Or were we always already, in which case the distinction between archaeology and reverse engineering is dubious from the outset? Moshenska attempts to address how we might distinguish archaeology from reverse engineering by aligning archaeology with the pursuit of knowledge for its own sake whereas reverse engineering is more directly economic (p. 21). I suggest that this might not be the clear distinction that it appears to be. In his later critique of archaeology's use of Marc Augé's concept of the non-place, Moshenska rightly points to the ways in which the abstraction neglects the real experiences of the people who work, travel through and occupy such spaces. Similarly, developer-funded archaeology, archaeological work carried out in museums and heritage contexts and archaeological teaching to fee-paying students connect archaeological practices directly to economic activity. This would seem to apply equally to prehistoric archaeology and the archaeology of deindustrialization.

There are other considerations that might cause the reader to hesitate around the application of reverse engineering to archaeology as a conceptually productive framing. Where the situated action model developed by Lucy Suchman shines a light on how people and machines interact in the processes of planning and use, understanding objects (whether as artefacts or as sites) through their dismantling potentially produces an overly linear history. This has been one of the critiques of media archaeology, a field that could also be framed in terms of reverse engineering (see papers in the *Journal of Contemporary Archaeology*, 2015 Vol 2.1). Media archaeology lab practices are seen to move away from an artefactual focus to explore operationality as a performance-based epistemology that attempts "to open up ways of knowing the world from a technological perspective" (Parikka 2015: 11). In both media archaeology and reverse engineering, the focus on dismantling as a form of revelation sediments the idea that we must return to the point of original production in order to understand subsequent operation.

However, on balance, the crux of Moshenska's argument is that the processes of reverse engineering offer the potential for archaeologists to work on (post)industrial sites and artefacts without rushing either to the romance of ruin and loss or to a celebratory modernism. In the absence of the ethnographic eye observing the production process, reverse engineering attempts to access industrialization's ad hoc, messy human-to-human and human-to-other-than-human relationships. Moshenska's conclusion that it is at "the point in a process of reverse engineering where our reconstruction stumbles or fails...where we might infer human agency or tacit knowledge" (p. 25) and assertion that reverse engineering attempts to breathe the human back into technological artefacts and processes clearly articulate the value of this exercise in imagination. It is here that Moshenska's arguments appear to echo Louis Althusser's aleatory materialism:

Every encounter is aleatory in its effects, in that nothing in the elements of the encounter prefigures, before the actual encounter, the contours and determinations of the being that will emerge from it [...] No determination of these elements can be assigned, except by working backwards from the result to its becoming, it is retroaction (Althusser 2006: 193).

Here, Althusser's materialism and, by extension, Moshenska's reverse engineering, might suggest Walter Benjamin's take on Paul Klee's *Angelus Novus* in "Theses on the Philosophy of History" (1968 [1937]). Because every encounter in the here-and-now produces random effects, sense-making can only happen in reverse. Yet, with each passing moment that sense-making is reshaped. With reverse engineering, the contours and determination of the being of artefacts is similarly subject to unforeseen losses, breakages, bodged repairs, and so much depends on at which point the process of reversal begins.

Reverse engineering, with its focus on practice and on imaginative rear projection, is also very close in spirit to reenactment. Moshenska refers in passing to experimental archaeology techniques and how these relate to reverse engineering. These points of connection are interesting and warrant further conversation, particularly as they intersect with his opposing of knowledge-for-knowledge's-sake and knowledge that is directly economically framed. As historian Vanessa Agnew suggests, reenactment is a "body-based discourse in which the past is reanimated through physical and psychological experience" (2004: 330). Reenactment, from the pioneering kitchen to the

Avro Vulcan, involves the reverse engineering of technologies and then their reanimation through experience and operation. It is also a field in which both knowledge for knowledge's sake and the economic pertain.

Moshenska's paper, particularly the concluding section, offers much to those of us with interests in the archaeology of the contemporary world. After several readings, I remain intrigued by the conceptual and methodological work that the term 'reverse engineering' can do for archaeologists. What might referring to my fieldwork as reverse engineering do for the research that simply referring to it as archaeology might not? Does it more concretely link archaeological interests in industry and technology to the design and manufacturing sectors that produce the things we look at? Does reverse engineering produce new ways of understanding human and other-than-human relationships? Moshenska ends in an admirably humble style, suggesting to his reader in the final sentence that all of this has been offered as food for thought, an opening into a much longer conversation. I very much look forward to hearing more.

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