

From Kindling to Kindles: A Review of Matt Hayler, *Challenging the Phenomena of Technology: Embodiment, Expertise and Evolved Knowledge* (Basingstoke: Palgrave Macmillan, 2015)

Rosie Graham <R_dot_Graham_at_bham_dot_ac_dot_uk>, University of Birmingham

Abstract

“From Kindling to Kindles” is a review of Matt Hayler’s *Challenging the Phenomena of Technology: Embodiment, Expertise and Evolved Knowledge* (Basingstoke: Palgrave Macmillan, 2015). Hayler’s text is an investigation into the current theoretical framework surrounding our contemporary usage of the term “technology.” To do this *Challenging the Phenomena of Technology* moves through how we define technology, why the same artefacts might be fundamentally different for different users, how this might change our understanding of embodied knowledge, and finally places these issues into a nonhuman context. The book offers exemplary accounts of how to tackle interdisciplinary concerns that relate to so many aspects of our lives.

Introduction

There are a number of wide-ranging questions embedded throughout Matt Hayler’s *Challenging the Phenomena of Technology: Embodiment, Expertise and Evolved Knowledge*: How do we read? How do we engage with the world around us? What separates experts and amateurs? Can we think about technology from a nonhuman perspective? To answer these questions, Hayler draws on a wide range of research areas and in doing so produces an exemplary interdisciplinary model. One of the main strengths of *Challenging the Phenomena of Technology* is that it provides an insight into some of the most contemporary issues currently causing debate in a wide number of disciplines. Hayler’s balanced description of various contexts will introduce readers to a number of discussions occurring behind disciplinary walls and explain why we might want to care about them.

1

Challenging the Phenomena of Technology will be of particular interest to Digital Humanities scholars. One of the main thrusts of the book is how pervasive a certain kind of language surrounding technology has become in Western discourse. The boundaries between artificial/natural, organic/augmented, tool/technology, practice/expertise are constantly being redrawn in new ways, but ways that are informed by a complex history. *Challenging the Phenomena of Technology* shows that, rather than being a subset of niche concerns, questioning what we mean by technology relates to everything we do. Therefore, I feel that Hayler’s work speaks directly to the Digital Humanities community (both to our big and small tents). Even those researchers on the fringes of the DH community will be accustomed to the kind of discourse that surrounds our self-clarifications and, at times, self-defences. That DH might be about focusing our attentions to new media, digital content, or the use of digital methods inevitably draws up distinctions between “natural” humanities scholarship and newer “technological” departures. *Challenging the Phenomena of Technology* seeks to dismantle such a distinction, demonstrating how the “natural” has always been a complex arrangement of constructs. For example, Hayler asks, why should a pen be treated as less technological than a computer? And are either of them in the same technological realm as, say, my microwave or CERN’s Large Hadron Collider? In doing so *Challenging the Phenomena of Technology* moves through how we define technology, why the same artefacts might be fundamentally different for different users, how this might change our understanding of embodied knowledge, and finally, it places these issues into a nonhuman context. Its comprehensive coverage of such expansive topics in a book of under 250

2

pages should be commended. Hayler's sources may come from a diverse group of disciplines but the narrative is focused and bolstered with contextual awareness.

Challenging the Phenomena of Technology covers a lot of ground and for that reason this review will not attempt to address every aspect. However, I have attempted to capture the central argument that builds through Hayler's work, and have arranged the review into five sections that broadly correspond to the five chapters of *Challenging the Phenomena of Technology*. The first three sections mainly consist of short summaries, which are important for understanding Hayler's later arguments. In section three I set out how my theoretical perspective differs from Hayler's and the ways in which they might be productively compatible. The final two sections of this review attend to what I believe to be the most innovative and stimulating aspects of *Challenging the Phenomena of Technology* and therefore include more analysis and suggestions of possible avenues for further development of Hayler's work.

3

One: What is "Technology"?

Challenging the Phenomena of Technology: Embodiment, Expertise and Evolved Knowledge aims to do just that: challenge. Challenge our definition of technology, but also any claims to naturalness we might have. The opening chapter outlines various resistances to technology and uses e-reading as a key example. Why have e-readers provoked such resistance?

4

Hayler draws on a wide variety of folk phenomenological (non-academic, personal reports), philosophical, and cognitive science arguments. These resistances are then separated into two "flavours": the "romantic: digital technology for reading provides a layer of visceral insulation between us and the sensual world of which printed books are a very pleasant part" and the "scientific concern: e-reading negatively impacts upon our cognition and impoverishes the experience of reading in a quantifiable way" [Hayler 2015, 19]. The distinction here is not between the amateur and the academic; Hayler cites various scientific studies that are commonly used in public discourse as well as a number of academic professionals drawing on "romantic" arguments. Although he does not deny the grounded reality of the complaints, Hayler's perspective is that both sets of arguments are built on shaky ground. The scientific arguments against e-reading are often based on bad leaps of faith, scientism, and the drawing of conclusions from unrelated studies. As is unsurprising for such a young technology, there is real lack of primary research:

5

no study has put anyone in an fMRI, or any other type of machine, with a printed copy of *A Tale of Two Cities* and a digital edition to see what's different, no one has yet compared like for like.
[Hayler 2015, 32]

This is also unfortunate due to the number of "romantic" arguments made recently against e-reading that too draw on science to anchor their concerns to statements about how the brain functions naturally.^[1] However, the main thrust from the "romantic" camp is that technology "separates us from the world" [Hayler 2015, 4]. In response to this assertion, Hayler draws on archaeological and anthropological research that argues that humans have been technologically embedded from our earliest times as a species. In this vein, Hayler builds on the arguments of Timothy Taylor in *The Artificial Ape*, arguing that "the idea of humans versus technology is wrong...Technology is at least as critical to our identity as our soft tissues" [Hayler 2015, 189]. If technology has been central to our evolution as a species and inextricably embedded in a long history of cultural activities, then perhaps we need to interrogate the word "technology". What is it that we "really" mean when we use this word, with either positive or negative connotations? Rather than avoiding this nebulous term, what happens if we develop a new definition of technology, one that helps us better understand the relationships between humans and artefacts? These are the leading questions of the next section of *Challenging the Phenomena of Technology*.

6

Two: A New Definition of Technology

Hayler's second chapter outlines a number of existing approaches to defining technology in a concise and clear manner that quickly bring the reader up to speed.^[2] These contextual frameworks prove useful in Hayler's later arguments, however their main purpose at this stage is to make a foundational statement from which the main body of the book

7

follows. Hayler argues that:

There is no such thing as “technology” by any persuasive definition, nothing we can point to or touch, or describe consistent properties of, particularly in its day-to-day use. This is a problem. It is a remarkably loose term; we might often agree on the objects under discussion – computer: yes, coriander: no – but the specifics of why this might be so are vague. “Technology” is, at best, a consensus description of equipment and practices. [Hayler 2015, 60]

This declaration leads to one of the most exciting assertions of *Challenging the Phenomena of Technology*: for Hayler, technology is “not a class of objects, but a class of phenomenological experience with several consistent features” [Hayler 2015, 4]. His placing the emphasis on practice, process, and active encounters rather than on lists of static objects reconceptualises technology in a number of useful ways. To do so Hayler draws on the philosopher of technology Joseph C. Pitt’s statement that “technology is ‘humanity at work’” [Hayler 2015, 61]. This allows Hayler to start from, as he puts it, a place of “dramatic inclusivity” [Hayler 2015, 61] but one that allows us to pay attention to technological “experience” that is so integral to this text. Using this broad focus, Hayler draws up four criteria that are important for understanding technology as a phenomenological encounter. Hayler preempts the counterintuitive nature of his criteria by suggesting that his definition

8

will produce some initially strange, but hopefully illuminating, results; the definition that I want to deploy will see, at least potentially, a book, a hunting dog, and a dancer’s body as technologies, but banish the Large Hadron Collider, an ATM machine, and a microwave from the same category. [Hayler 2015, 61]

This is a dramatic warning shot, designed to provoke: how can such a statement be true? Developing after the first chapter’s contextualisation of reactions towards technology and its deconstruction of certain conceptions of naturalness, this kind of statement should not come as such a surprise, yet it initially comes across as illogical. It is therefore a deserved credit to Hayler’s following criteria that lead such strangeness to become a realistic proposal. Not every reader will be convinced, but all will certainly understand why we might want to suggest that a hunting dog is more technological than a microwave. Hayler’s four criteria are as follows:

9

- Technologies EXTEND our means or ability to accomplish tasks.
- Technologies are COMMUNAL, existing only in communities of users.
- Technologies are able to become, if only temporarily, skilfully INCORPORATED into our embodied cognition.
- Technologies have an effect on their users, they are DOMESTICATING. [Hayler 2015, 71]

Through the above criteria, “dance, language, the use of fire” and even “analytic thought” [Hayler 2015, 109] can be considered technological forms. Hayler’s argument, as becomes clear in his later use of Object Oriented Ontology (OOO), subscribes to a flat ontology. In doing so, techniques and objects can exist on equal grounds as forms of technology. Therefore techniques such as “writing, driving, computing” can be seen as technologies in the same way as “its accompanying device (pen, car, computer)” [Hayler 2015, 109]. This allows us to escape from a hierarchy of natural vs. artificial or artefact vs. technique. Using this definition, Hayler forces us to pay more attention to context and histories of practice rather than on material distinctions. Applying such a definition to examples can then help us as readers continue to ask what we mean by the word “technology”. It is often the most jarring examples that lead to the most productive considerations, moments when Hayler’s definition leads to results that oppose our “common sense” definitions.

10

Three: How Do Experts See Things Differently?

Hayler now moves from his definition of technology to deal specifically with expertise: how the same object can be different to two separate people. Significantly, Hayler wants to portray the interplay between humans and artefacts as distinctly dialogical: he states that artefacts “are both objects and shapers of cognition and perception, [and] they are both moulded in and come to mould our minds” [Hayler 2015, 119]. For Hayler, objects direct our cognition in various

11

ways whilst at the same time our cognition constrains how those objects exist to us. A main part of Hayler's assertion is that however I might think about an object and whatever my skill or disposition, there is always a real version of that object that I will never fully understand. In doing so, Hayler draws on Edmund Husserl and Maurice Merleau-Ponty's phenomenological approach to argue that we can draw closer to an artefact, but that this process will never be complete: "some element must always escape our comprehension" [Hayler 2015, 119]. Part of this approach appears to develop within a wider *posthumanist* context: it is hubris to think that a master carpenter fully comprehends every part of the wood and tools she uses. At the very most, the carpenter might understand the grain, flexibilities, and resistances of the wood better than any other human. Even at this stage the carpenter will never grasp the wood as it *really* is. A bacterium, woodworm, or bird will all understand the same wood in ways the carpenter cannot even comprehend. But it is not simply enough to add up all these various interactions the wood might have and draw up a holistic description of the wood that takes all these perspectives into account. For Hayler, the essence of an object will always retreat and can never be fully comprehended. In this context Hayler uses the term *gestalt* to describe how we make composites of separate instances of interactions. The more we think we know about an artefact the more fixed our gestalt becomes. These gestalts are simplifications of artefacts: when someone becomes an expert at interacting with certain objects they are reducing its essence to how it relates to them and their specific task. When we fail at a task it is often because our gestalt does not match the actual nature of the objects at hand. Our expert carpenter is surprised less often by their wood and tools in comparison to an amateur, for whom the saw jars and stutters rather than flowing gracefully. Here we might describe their skill as a developed gestalt; the carpenter is not surprised because they have simplified the wood to a certain set of characteristics within a particular context.

Placing this back into a phenomenological context, Hayler uses the term *sensual object* to distinguish the personal and incomplete object that the carpenter encounters from the real object of the wood that cannot be fully encountered. It is, in fact, during a skillful sawing action that the wood and tools hide away from the carpenter: a distinction of ready-to-hand that Hayler borrows from Heidegger. Hayler anchors this idea to the theory of metaphor presented by George Lakoff and Mark Johnson in *Metaphors We Live By*. In essence, we navigate the world using metaphors at a fundamental level, and to Hayler, when we turn from one artefact to another we often attempt to treat the latter as the former. This is why many struggle with, for example, e-reading. We bring our gestalt, our experiences and expertise from physical codex reading to bear on an artefact that is not the same. It is not that we understood the essence of books or that we fail to grasp the essence of a Kindle, but that trying to metaphorically treat e-readers as new types of paperbacks results in a mismatch. We must avoid being constrained by old metaphors, in language and in practice. But what is expertise anyway? How much knowledge of an artefact is possible? Although, as stated earlier, Hayler argues we cannot fully understand an object, there is a relationship between the user's gestalt and object itself. He argues that:

12

True expertise must be about experiencing things as closely as possible as what-they-are, not in terms of some other thing; the reliance on metaphor will keep us as amateurs unable to see the true affordances of the artefact that we are working with. [Hayler 2015, 139]

Here Hayler borrows the term *affordances* from psychologist James Gibson. The term describes the opportunities or potentials for particular actions with an object. For example: a handle affords turning whereas a cord affords pulling. An expert therefore is someone whose expectations align in some way with the true affordances of an artefact. Hayler argues that "affordances are real qualities of sensual objects" [Hayler 2015, 145 footnote 24]. What intrigues me is what happens when certain sets of affordances that overlap are in conflict. To take an example, we can say that a bench affords sitting: it is smooth, horizontal, and free from traffic. We could also say that the same bench affords skateboard grinds. The affordances are, in fact, very similar. However, the more skateboarders grind on the bench, the less it affords sitting; the surface becomes worn and uncomfortable. To Hayler, affordances are part of sensual objects (created through our interaction) rather than the object on its own terms. However, at what point does the wear from the grinds change the essence of the bench into something new, or is it still a version of its original form. If we are to agree that the bench is now a new bench (i.e. only good for grinds and not for sitting) the distinction of its *real* essence becomes subjective (or at least based around the sensual object of the skateboarder). At its core it seems that Hayler's definition of technology is an attempt to avoid this kind of thinking and to eschew subjectivity.

13

A similar query arises later in the book when Hayler sets out the theoretical basis for his ontology of objects: on the one

14

hand we have Actor Network Theory (ANT), Bruno Latour, and Peter-Paul Verbeek, and on the other we have Graham Harman and Object Oriented Ontology. Each has an influence on Hayler's argument but there is an issue where ontologically he must take sides: which is more primary, entities or relations? Hayler states that:

the postphenomenology that I'm interested in *does not* find its foundation in relations [...] for me, the foundation for this entanglement is actually a radical *division* [...] Verbeek, as Latour, accepts that relations do not produce entities out of nowhere, but claims that those entities do not function as actants with essential properties until they enter relations which structure what they are as actants. I want to emphasise the importance of all actants before they interact, what they both bring to and withhold from the table. [Hayler 2015, 162]

Hayler's ontology is based around real objects that consistently surprise us and evade our full understanding. My trepidation however, is that treating entities as having essences prior to any relations might bias these essences as singular. This choice relates back to the overlapping affordances of skateboards and benches. If we want to claim there is a "real hammer" that precedes its interactions with the world, then to me, this singularity can only ever be based on *our* (human) version of events. Therefore, I side with the ANT version of events, which places relations at the foundation of its ontology. 15

Hayler marks out these two positions (OOO vs. ANT) as incompatible. However, I believe there are some significant ways in which an ANT approach is compatible with many of Hayler's conclusions. In fact I think an ANT reading of Hayler's perspective enlarges its scope and that switching between these two viewpoints can be productive. I will therefore, in addition to outlining Hayler's OOO approach, try and reconcile these perspectives, or at least demonstrate how it might not be necessary to adopt either exclusively, in the context of the book's conclusions. 16

Four: Technology as Embodied Knowledge

The final two sections of *Challenging the Phenomena of Technology* attach Hayler's earlier arguments about technology to a pragmatist perspective of knowledge. The argument is that objects are embodiments of knowledge. That is, knowledge is defined as "any stored data that enables repeatable and successful action within an environment" [Hayler 2015, 164]. This knowledge lies outside of a human correlationism: it is not simply born out of our relations (what Hayler calls the sensual object or human *gestalts*) but belongs to "things themselves [...] it's the real things that know" [Hayler 2015, 155]. Drawing on OOO, Hayler argues that all objects have a realness that cannot be fully satisfied through interactions with either humans or other objects. As elaborated above, when I interact with a saw I will never fully grasp its essence, only what is important to me at that time: what becomes my sensual *gestalt*. The same is true of object-to-object relations; when rainfall encounters a gorge there is an encounter that exchanges information and changes the form of both the rain and the rock. However, the rock has not encountered the essence of the rain and neither has the water encountered the essence of the gorge. Both entities have encountered only the qualities relevant to them in that particular encounter. OOO allows Hayler to argue that nonhuman entities can interact with other nonhuman entities in a variety of ways that involve knowledge, without needing to affirm cognition upon rocks and rain. As Hayler writes: "no two objects ever meet each other as they are, but only as they appear to one another" [Hayler 2015, 178]. Hammers and nails have knowledge of one another, but only as they relate to their own actions. Again, knowledge, as Hayler uses the term, is not about hammers having thoughts and feelings but about objects comprising "any stored data that enables repeatable and successful action within an environment" [Hayler 2015, 164]. Therefore, the flat top edge of a nail constitutes a kind of knowledge about hammers, or at least enacted data that enables hammers and nails to interact. 17

Although Hayler agrees with the OOO perspective that we cannot know the real essence of an object, he diverges from Harman (and other OOO proponents) in that he believes we can align our sensual objects (our encounter of an object) closer to the real object through experience and expertise. Therefore, "the way that all objects encounter other objects, *can* include a potentially asymptomatic approach, through this needn't imply direct access" [Hayler 2015, 189], where asymptomatic refers to a curve on a graph that gets increasingly closer to a value but never reaches it. In this way Hayler places the emphasis on expertise: objects always escape us but that does not stop experts from aligning their sensual objects close to the real thing. This would account for the successful action of experts. By my understanding 18

this does not just refer to experienced craftspeople but also, due to the posthumanist position of OOO, the repeated erosion of a gorge by a regular pattern of rainfall. The rain does not grasp the essence of the rock but perhaps the action of erosion constitutes knowledge in Hayler's pragmatic outlook of repeatable and successful action. This brings us to why, even though as stated above I side more with an ANT approach at possible odds with Hayler's project that prioritises relations over entities, I think the conclusions of *Challenging the Phenomena of Technology* still hold true for this alternative outlook. Hayler's position is open to an outlook that prioritises process. I believe that even if we prioritise relations over entities, much of Hayler's argument is still persuasive, particularly in the context of distributed knowledge:

The expert's knowledge of, for instance, hammering is partly formed of data inside her brain, but the relevant data is also in the hand and the arm that operate the tool, in the tool itself and its feedback, and in the act of hammering with *this* hammer in *this* moment in *this* milieu [...] experience always prompts new data to draw on, and this tends to strengthen the coherence of sensual gestalt and real object. Such data is always dispersed across the contextualised 4EDS [the umbrella term Hayler uses for cognition which is distributed, extended, embedded, or embodied] soft-assemblage – it is the *technical encounter* that knows best, not just an expert human brain [Hayler 2015, 194]

Hayler stresses the changing and individual nature of objects. His emphasis of “*this* hammer in *this* moment in *this* milieu” [Hayler 2015, 194] asks us to see technological interactions of objects as specific interactions that generalised critiques of “technology” overlook. Hayler's structuring of interactions as a coherence of real objects and sensual gestalts helps us understand objects as mysterious and mostly hidden to everything with which they interact. To me however, placing the emphasis on specific encounters that are unique to a particular context where “it is the *technical encounter* that knows best” [Hayler 2015, 194] prioritises the system rather than individual entities. That we might only be able to engage with the sensual objects part of that assemblage explains why systems can behave in such unexpected ways. Perhaps the fact that the knowledge is held in the interaction of these unknowable objects owes credit to Hayler's argument that each object has a real essence outside of its relations: we cannot fully know the system of interactions because we cannot fully understand the objects at play. Perhaps we might even want to argue that *relations* can be described with Hayler's language of real and sensual objects, aligning gestalts of knowledge, just as productively as *entities*. Perhaps such a reading would not lead to an orthodox ANT approach, and instead simply lead Hayler's method away from Harman and towards a kind of thinking similar to Jane Bennett's vital materialism [Bennett 2010].

19

Whichever way one reads it the conclusion is exciting. The first reading, which supports Hayler's insistence that entities come first, is useful in various dynamic contexts. An alternative model, which incorporates an ANT or process disposition into Hayler's OOO-inspired conclusions, also yields interesting results, one that challenges the distinction between entities and relations. This ambiguity sets the stage for the final argument of *Challenging the Phenomena of Technology* that I believe is convincing either on its own terms or through an ANT perspective.

20

Five: The Evolution of Technology

Hayler's final section develops his pragmatic distinction of knowledge as embodied in objects by arguing that this knowledge is subject to evolutionary pressures. Hayler traces the roots of this evolutionary epistemology and outlines the modes of thought necessary to treat artefacts as subject to the evolutionary pressures of “*variation* (due to mutation), *selection* (due to pressures from the environment), and *reproduction* (due to an individual's success)” [Hayler 2015, 211]. Using the example of the codex, Hayler argues that books are subject to *variation* (for example, mutations such as oversize atlases and pocket editions), *selection* (through pressures of the marketplace), and *reproduction* (by reprinting successful books and more generally the stabilisation of publishing norms). In this way we can treat the range of possible books as the gene pool and the variety of codices that continue to be printed as the phenotypic expression of that gene pool. The books themselves do not have any agency; they are not trying to survive. However, the environment (in this case humans) is shaping their existence through reproduction of forms that are the best “fit” with that environment. As Hayler expresses it, “evolution is all about repeatable successful action” [Hayler 2015, 215] which we should remember is his definition of knowledge in a nonhuman context [Hayler 2015, 164]. The distinction Hayler

21

makes between gene pools and offspring as a partial product of that gene pool is quite persuasive in the context of objects having a real but unknowable essence. I think it is more than metaphorical to say that in this context the unexpected nature of epigenetics can echo very well the unexpected ways in which objects can change and react in new contexts, while retaining a concrete, or at least traceable, identity.

To project this version of artefacts as embodiments of knowledge developed through evolutionary pressures into a truly nonhuman context, Hayler draws on the work of Henry Plotkin. In *Darwin Machines and the Nature of Knowledge*, Plotkin uses stick insects as an example of embodied knowledge. The body of the stick insect, unbeknownst to the insect, embodies knowledge of its surroundings. Hayler argues, through Plotkin, “the stick insect’s body therefore possesses knowledge of an aspect of the world far greater than its own mind is capable of” [Hayler 2015, 217]. Placing this in an OOO context, Hayler argues that even though it seems like the body of the insect has knowledge of the plants it lives in, it is only ever a partial knowledge. The body of the insect (or the species as a whole) has knowledge that only relates to the way its predators’ eyes function: the rest of the environment recedes. Nor does the knowledge held in the environment fully satisfy the stick insect’s existence, which is a benefit of an OOO outlook. We must be sympathetic to the depths that we will never understand; we cannot simply use descriptive characteristics about the insect or environment to claim that we fully understand them. The knowledge that humans, branches, or a stick insect’s body hold is never exhaustive. To Hayler, knowledge only ever concerns sensual gestalts. This then allows a way of seeing a whole host of individuals, animals, objects, artefacts, and technologies as “knowing” about the world around them while maintaining their ability to surprise and be surprised by interactions. This also brings us back to one of the opening examples of *Challenging the Phenomena of Technology*: what is going on when people reject Kindles, even if they “work” just as well as a codex? Knowing Hayler’s argument, we can say that the evolution of the codex reflects a hard-won journey and one that embodies a vast amount of knowledge concerning reading practices and our relationship with the written word. Disconnected from this history, e-readers have a different (and more recent) set of affordances and characteristics. Kindles have had less time to adapt and reflect their environment and therefore our sensual gestalt does not align with the real essence of the artefact. Nor does the knowledge embodied in the Kindle adequately reflect its users. Hayler argues that we do not *know* e-readers yet, but also, in equal measure, that e-readers are yet to know us well enough either. Hayler articulates that:

22

We may feel uncomfortable with the idea that codices possess knowledge rather than simply store it, but this only reflects a prejudice surrounding the use of the word “knowledge” as a narrow band of human experience, rather than seeing that band as a subset of something that we share with the world that we have emerged from and remain in complex concert with. [Hayler 2015, 225]

This posthumanist stance allows human beings to be humble towards the world, and in particular towards technology. I also think that this conclusion, although developed out of an engagement with OOO, does not require us to reject models that place interactions before entities. Much of what Hayler describes as “knowledge” develops through interactions. To my mind, although many of these leave traces (the shape of an insect’s body), there are also types of knowledge that emerge and dissipate without leaving a permanent trace. Read in a digital context, in which more of our world is governed algorithmically, I think there are countless times in which rapid change is the norm, rather than stable entities. Increasingly our interactions with technology rely on knowledge as *emergent* successful actions rather than *repeatable* ones. If we read Hayler’s conclusions concerning situated knowledge in this context I think the results are very productive.

23

Throughout my reading of *Challenging the Phenomena of Technology* I frequently tried to apply Hayler’s method to various examples. In particular I kept relating Hayler’s model to my own research: that of web search engines. I found this a particularly interesting test case, particularly as it fits Hayler’s criteria of a technology. Using Google regularly extends my ability to accomplish tasks, functions through community, is incorporated into my cognition, and domesticates me in various ways. I can also divide Google along the lines of sensual vs. real object. I have knowledge of a sensual gestalt (the data, links, and ranking that takes place) but not the real essence of the process. Everything so far works with Hayler’s definition. The trouble is, Google is in no way a singular or static object. Google is all the varied contexts in which vast datasets are used, the engineers employed, and the vast network of users that change the ranking through daily use. Google search is less like a single technology and more like a coordinated emergent

24

response from a number of different elements that cannot be fully predicted. Google search results are localised and personalised to each user, their ranking reassessed with every query, and they are organised through sets of algorithms that are altered and revised constantly.^[3] Even the engineers are not fully in control as the searches and other usages create patterns measured by potentialities rather than firm predictions. The way this network changes can, I think, be described and elaborated using Hayler's framework very usefully. However, its usefulness lies in the ways it describes processes rather than specific objects. Considering search engines, where can we draw the boundaries around the technology? Is each algorithm a separate and interlocking technology; each engineer, each user? Results change second-by-second in a way that I think differs from the evolution of codices in more than simply speed. Any set of criteria that draws boundaries too firmly around objects is going to misrepresent this kind of technological mode that is becoming increasingly ubiquitous. This is why I think Hayler's conclusions are valuable beyond a commitment to the OOO project. Because of the evolutionary context, knowledge is described as dynamic and emergent, as Hayler puts it: "all things never meet one another as they are, always reducing and approximating, always escaping and surprising one another" [Hayler 2015, 231]. In doing so Hayler's definition works both for "traditional" technologies or ones which might seem to demonstrate a more stable sense of identity, *and* newer technological modes or systems that seem harder to define. What if we were to describe *relations* in terms of sensual and real objects? What if we argue that an algorithm has a sensual gestalt of a particular dataflow; a dataflow that is obviously real but, due to its speed and the colossal number of contexts in which it becomes meaningful, can only ever be considered through partial knowledge? Perhaps Hayler would see such attempts as a misappropriation of his method, but regardless, the kind of model he presents allows for new ways of theorising complex technological issues. Not only does *Challenging the Phenomena of Technology* allow us to conceptualise technology in a more nuanced manner but it does so by incorporating usage and context. As Hayler argues in his conclusion:

whilst we may catch an object's whatness in glimpses through coherence, all that we can truly rely on remains the equipment's 'thatness,' not what makes it what it is, but simply that it exists to us at this moment as this thing [Hayler 2015, 233]

Hayler's method allows him to capture traditional attitudes towards technology whilst incorporating a temporal and contextual attitude that is key to our emerging digital landscape. In doing so, *Challenging the Phenomena of Technology* excels at historicising our technological circumstances and is convincing in its argument that redefining our contemporary definition of technology is important not only for scholarship but for navigating the world. 25

Challenging the Phenomena of Technology is most successful in its sensitivity to context and in surveying a number of crucial questions that various disparate disciplines are addressing from different angles. Hayler provides us not only with a specific set of proposals concerning technology, but with an outline of some of the most pressing contemporary debates and arguments being put forward in a variety of research areas. *Challenging the Phenomena of Technology* is important reading for those in the humanities, cognitive sciences, philosophy, and digital humanities. It is of particular importance for those researchers wanting an exemplary account of how to tackle interdisciplinary concerns, and how to address them sensitively by putting forward arguments that will provoke a wide range of stimulating and productive responses. 26

Notes

[1] A movement that Romanticism scholar Steven E. Jones associates with "Neo-Luddism" (see Steven E. Jones, *Against Technology: From the Luddites to Neo-Luddism* and Nicols Fox, *Against the Machine: The Hidden Luddite Tradition in Literature, Art, and Individual Lives*).

[2] The clarity of the section, in particular the differentiation between the approaches of similar thinkers, is excellent. The chapter gives short summaries of the approaches of Leo Marx ("Technology: The Emergence of a Hazardous Concept"), Bernard Stiegler (*Technics and Time*), Martin Heidegger ("The Question Concerning Technology"), Jacques Ellul (*The Technological Society*), José Ortega y Gasset (*Meditación de la Técnica*), Paul DeVore (*Technology: An Introduction*), and Michel Foucault ("Technologies of the Self").

[3] For more detail, see Steven Levy, *In The Plex: How Google Thinks, Works and Shapes Our Lives* (p. 61) in which he interviews engineering staff at Google about the process of constantly altering algorithms.

Works Cited

Bennett 2010 Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham, North Carolina: Duke University Press.

Fox 2002 Fox, Nicols. *Against the Machine: The Hidden Luddite Tradition in Literature, Art, and Individual Lives*. Washington, D.C.: Island Press, 2002.

Hayler 2015 Hayler, Matt. *Challenging the Phenomena of Technology: Embodiment, Expertise and Evolved Knowledge*. Basingstoke: Palgrave Macmillan, 2015.

Jones 2006 Jones, Steven E. *Against Technology: From the Luddites to Neo-Luddism*. New York: Routledge, 2006.

Levy 2011 Levy, Steven. *In The Plex: How Google Thinks, Works and Shapes Our Lives*. New York: Simon & Schuster.



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.