

Virtual, Phenomenal, Real, and Mobile

Abstract

The debate between 'realism' and 'social constructivism', rehearsed and overviewed in Ian Hacking's book, "The Social Construction of What," (Hacking 1999) has nonetheless seen a number of attempts to find common ground, or unifying principles / theoretical frameworks. Notable amongst these have been Karen Barad's feminist/cyborgian inspired agential realism, and Wanda Orlikowski's actor-network-theory inspired sociomateriality. Barad links Neils Bohr's quantum mechanical reformulation of objective reality with Michel Foucault's theorising of the social and political aspects of practices and apparatuses (Foucault 1995a; 1997), to conceive objects as material-discursive phenomena: 'agential realism.' "If our descriptive characterizations do not refer to properties of abstract objects or observation-independent beings but rather describe agential reality, then what is being described by our theories is not nature itself but our participation within nature" (Barad 1999:7). Beyond the similar dichotomies between 'techno-centric' and 'human-centred' approaches to understanding technology, whereby either technology "leverages human action" or "'vanishes' from view in the preoccupation with the social," (Orlikowski 2006:461), Orlikowski proposes a third approach, citing Latour (1992; 2004), and Law (1992) among others as having provided a theoretical framework that eschews this binarism. Orlikowski's approach focuses on what she terms the "scaffolding of knowledgeability" (ibid 2006:462), characterising knowing as being scaffolded "culturally (e.g., through codes, language, norms) and materially (e.g., through physical objects, biological structures, spatial contexts, and technological artifacts)," (ibid 2006:462) with special emphasis upon the last.

This paper offers a brief precis of the position taken by these two authors, in the context outlined by Hacking, and picks out some of the linkages between the two. It then seeks to explore how these two attempts to bridge the gap between realist and social constructionist points of view might benefit from the philosophical standpoint of Henri Bergson's concept of the *durée réelle*, or real duration, and its poststructuralist interpretation by Gilles Deleuze (Bergson 1944; Deleuze, 1991). Bergson maintains that intellection splits and categorises the past, not the unified unfolding present, which is apprehended intuitively, rather than intellectually, in our consciousness, thus offering a reconceptualisation of time and space that allows for both realism (in our intellectual apprehension of the past) and social constructivism (in our immediate experience of the present.)

Finally, smartphones have enjoyed phenomenal growth in the latter part of the first decade of this century. By 2012 sales of such devices are predicted to outstrip sales of PCs, and by 2015 more people will be accessing the internet with such devices than they will be with a PC. (Meeker et al 2010) Key to the growth and popularity of such devices has been the convergence, not just of telecomms and photographic equipment, which helped drive mobile phone sales, and the addition of internet access, which defined the smartphone, but the

addition, following the success of in-car satellite navigation devices, of GPS receivers into mobile internet devices. The integration of GPS technology into smartphones, coupled with the consumer-led approach of Apple's iPhone, gave birth to a whole new class of location-based services for mobile internet devices, available in particular for the iPhone, but also for Android, and other devices.

With location based services becoming an increasingly important part of our lives, this paper lastly asks whether daily and intensive use of smartphones offers us a virtual layer to sociomaterial agential reality - making agential reality media-rich - and how this might present us both with further Bergsonian intellection ever closer to the present, but at the same time a much more ephemeral sense of the 'real.' Is such virtuality, the paper concludes, to be seen as any the less real than Barad's objectivity-as-phenomenon?

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Introduction

In recent years mobile internet devices have not only brought Facebook and Twitter to the palms of our hands, but increasingly location based services that offer us what is marketed as an 'augmented reality,' through the live-view digital viewfinder of the camera function, providing both informational and commercial overlays to the video-image of the world presented on the small screen. This 'augmented reality' is both immediate and constantly changing, depending on our location and movement.

Given the live nature of such 'augmented reality,' the purpose of this paper is to seek a durational, as opposed to a spatial, understanding of this layer of virtuality that contemporary technologies are bringing to our experience of reality. We will therefore need to explore ideas around the nature of technology, the nature of nature, and the nature of time and space. The discussion therefore will be both epistemological, and ontological.

At the outset, we must of course address what many theorists have regarded as a primary mistake in Western philosophy as old as the Greek thinker Democritus, and his atomistic conception of the real. In many contemporary circles, this mistake is cited as being at the core of what is regarded as an ultimately false argument between a so-called 'realist' approach, and a so-called 'social constructivist' approach.

Hacking (1999) provides us with a useful summary of these arguments, at the same time as unfortunately rehearsing several aspects of the original mistake. In this paper I will not try to repeat his work, but hope to show, through my discussion of Orlikowski, Barad, and Bergson, the nature of that original mistake, and Hacking's rehearsing of it. In her exploration of the nature of realism, Karen Barad (2007) mentions Hacking as advocating "realism toward entities", following Cartwright's separation of "realism about theories and realism about entities." She points out that Hacking grounds "his position on the ability of the experimenter to manipulate entities in the laboratory." In short, "That which exists is that which we can use to intervene in the world to affect something else." This is quite utilitarian, but also quite crucial, as I shall explain later, when introducing the ideas of Henri Bergson. For Hacking, "electrons are counted as real because they are effective experimental tools, not because they have been 'found.'" (Barad 2007:41) Barad settles on Haraway's preference, as against what she describes as the 'essentialist' leanings of Hacking and Latour, for *instability* as the core issue. I concur.

The paper will begin by offering a brief precis of the ideas of Orlikowski and Barad, and some thoughts on the linkages between the two, before arriving at the main section which will be an attempt to summarise the relevant ideas of Bergson to this discussion, focussing mainly on his treatise on *Matter and Memory*. The last two sections of the paper then attempt, firstly, to show how

Bergson's ideas underpin those of Orlikowski and Barad, and thus enable us to, then, in the final section, understand the phenomena of augmented reality from a new and revealing perspective.

Sociomateriality

Wanda Orlikowski's work focusses on "the importance of considering materiality in our studies of knowledge in organisations" (2006:460). This is useful, for the purposes of this paper, in introducing a means of understanding technology from a deeper perspective than the familiar dichotomies between 'techno-centric' and 'human-centred' approaches, whereby either technology "leverages human action" or "vanishes' from view in the preoccupation with the social," (2006:461). Orlikowski takes what she describes as a "performative" view of knowledge - it's not a thing but a capability produced and reproduced in recurrent social practices. Although her understanding of the notion of performativity makes no reference to Butler and others, and seems at times to lack the depth of Butler's approach, it nonetheless underscores the need for a shift away from a strict 'object-oriented' approach, without ending up too embroiled in the social. Orlikowski proposes a third way through, citing Latour (1992; 2004), and Law (1992) among others as having provided a theoretical framework that eschews this binarism. This alternative approach outlines a socio-materiality capable of encompassing both perspectives, and thereby not overlooking or devaluing the essential contributory elements of either. "Not only is human action dependent on such material matters," she asserts, but "it is constituted by them," and, focussing again on the performative, "practice necessarily entails materiality." For Orlikowski, in sum, "knowing in material." (2006:461)

This socio-material approach characterizes knowing as *emergent*, i.e. continually unfolding; *embodied*, i.e. experiential, tacit; *embedded*, i.e. "grounded in the situated sociohistoric contexts of our lives and work,"; and, significantly, *material* (Orlikowski 2006:460). To this background Orlikowski brings the concept of the scaffold, outlining a number of characteristics of scaffolding which she then applies to two vignettes, or short case studies, of technologies in organizational settings. The most significant of these characteristics are that scaffolds are *temporary*: typically existing for the duration of a project; *flexible*: "constructed in situ, adapted to fit the particular local conditions"; and *emergent*: "erected over time, changing in form and function, as needed to continue supporting the changing scale and scope of the element(s) being built over time." (Orlikowski 2006:461-2).

Orlikowski's approach focuses on what she terms the "scaffolding of knowledgeability" (2006:462). This characterizes knowing as being scaffolded "culturally (e.g., through codes, language, norms) and materially (e.g., through physical objects, biological structures, spatial contexts, and technological artifacts)," (Orlikowski 2006:462) with special emphasis upon the last.

Agential Realism

Karen Barad's *agential realism* emerges from her understanding, on the one hand, of Niels Bohr's quantum theory and, on the other, of Judith Butler's

Foucault-inspired notion of performativity. In both these understandings, she seeks to find process, fluidity, instability, and movement, where traditional philosophical approaches have found atomistic, fixed, objects.

In quantum theory, she focusses on the basic difference between the Nazi scientist Heisenberg (famous for the Uncertainty Principle) and his Danish contemporary, Niels Bohr: "For Bohr, what is at issue is *not* that we cannot *know* both the position and momentum of a particle simultaneously (as Heisenberg initially argued), but rather that particles do not *have* determinate values of position and momentum simultaneously." (Barad 2007:19) For Barad, this is core to her understanding and appropriation of quantum theory for her own arguments: "In essence, Bohr is making a point about the nature of reality, not merely our knowledge of it" (ibid). In other words, this is not just epistemology – it is more an ontology. "What he is doing is calling into question an entire tradition in the history of Western metaphysics: the belief that the world is populated with individual things with their own independent sets of determinate properties." (ibid) On the contrary.... "given a particular measuring apparatus, certain properties *become determinate*, while others are specifically excluded." (ibid). Summarising, Barad concludes "the heart of the lesson of quantum physics" is that "*we are a part of that nature that we seek to understand*" (ibid p26).

Having thus harnessed quantum physics to her cause Barad then explores the implications for philosophy. She agrees with Haraway that, "What counts as an object is precisely what world history turns out to be about." (Haraway 1988,588)." Rather than objects, Barad asserts, with Bohr, it is *phenomena* that we should concentrate upon. Phenomena, significantly, differ crucially from objects, in that whilst an object is something which *is*, a phenomenon is something which *happens*.

In this ontological focus upon what *happens* in the real, the notion of diffraction becomes central. Barad indeed announces it as "an apt overarching trope for" her book (ibid p27). Diffraction describes the behaviour of waves when they overlap or meet an obstruction. The wave-particle-duality paradox in quantum physics also uses diffraction: both light and matter itself display both wave-like and particle-like properties. "What lies at the heart of the paradox is the very nature of nature." (ibid p27) Barad points out that visual metaphors are common in epistemology – especially reflection. Again she uses Haraway to support her argument, reminding us that "Haraway proposes diffraction as an alternative to the well-worn metaphor of reflection.... Whereas reflection is about mirroring and sameness, diffraction attends to patterns of difference" (ibid p27).

Barad suggests that, "If the goal is to think the social and natural together, to take account of *how* both factors matter..... then we need a method for theorising the relationship between 'the natural' and 'the social' together without defining one against the other or holding either nature or culture as the fixed referent for understanding the other" - hence diffraction, which "involves reading insights through one another in ways that help illuminate differences as they emerge:

how different differences get made, what gets excluded, and how those exclusions matter.” (ibid p30) This diffraction, moreover, includes agency: “Our knowledge-making practices, including the use and testing of scientific concepts, are material enactments that contribute to, and are a part of, the phenomena that we describe.” (ibid p32).

Barad then, presents her formulation of *agential realism* “as an epistemological-ontological-ethical framework that provides an understanding of the role of human *and* nonhuman, material *and* discursive, and natural *and* cultural factors in scientific and other social-material practices, thereby moving such considerations beyond the well-worn debates that pit constructivism against realism, agency against structure, and idealism against materialism.” (Barad 2007:26). Addressing the leaning of some anti-realist positions towards relativism, for Barad, “agential realism” though staunchly nonrelativist, “rejects the notion of a correspondence relation between words and things and offers in its stead a causal explanation of how discursive practices are related to material phenomena.” (ibid p45). She again attacks the realist position by destabilising the notion of fixity. Quoting Hacking she relates how the notion of representationalism goes back to Democritus and the first distinction between the ‘real’ and its ‘appearance’ – caused by the concept of atomism: “Is the table a solid mass made of wood or an aggregate of discrete entities moving in the void?...The problem of realism in philosophy is a product of the atomistic worldview.” (ibid p48). Barad summarises: “the asymmetrical faith we place in our access to representations over things is a historically and culturally contingent belief that is part of Western philosophy’s legacy and not a logical necessity” (ibid p49). Ultimately, “The assumption of thingness remains in place at the base of Hacking’s entity realism” and Barad argues that “realness does not necessarily imply thingness” (ibid p56).

Barad offers performativity as a way out of this conundrum. “Butler draws on Foucault’s suggestion that the repetition of regulatory practices produces a specific materialisation of bodies...” she tells us, giving rise to Butler’s well known theory of iterative citationality. This gives an account of matter as “a process of materialisation that stabilises over time to produce the effect of boundary, fixity, and surface we call matter” (Butler 1993, 9) which for Barad means “an unsettling of nature’s presumed fixity” (Barad 2007:64).

As we shall see below, Bergson’s philosophy, from over a hundred years ago, not only presages all the questions Barad addresses, but, arguably, answers them more fully and more succinctly.

Sociomaterial agential realism

Orlikowski’s sociomateriality lacks the depth of an ontology, but as an epistemology, concentrating on our ability to know, like Barad’s agential realism it again focusses upon process in its assertion that knowledge is emergent, and the realism/social constructivism debate is a false problem. This knowing, however, Orlikowski asserts, is embodied, acknowledging how bodily experience is bound up with knowing, similar to Barad’s deeper foray into the performative nature of knowing. At the same, Orlikowski asserts, knowledge is embedded in

the sociohistoric contexts in which it takes place – or as Barad would suggest in the Foucauldian discursive practices in which it is situated. Finally, Orlikowski's theory asserts that in the end, because knowledge, even when it is simply on paper, is always physically extant, it is, fundamentally, material.

The value of Orlikowski's theory is in the way in which it brings arguments around techno-centric and human-centred understandings of technology into a middle way. Barad's agential realism, on the other hand, provides a more ontological approach to the same issues, harnessing quantum theory and performativity to present a seamlessly fluid reality that is at once material and social in an indivisible whole. As we shall see, both these views sit well in the Bergsonian world.

Bergson

The work of French philosopher Henri Bergson (b1859-d1941), although he seems to have fallen out of favour immediately prior to, and certainly following the second world war, as Phenomenology attracted more attention, was closely examined by one of the fathers of poststructuralism, Gilles Deleuze, in the mid 1960s, and has, during the first decade of this century, been enjoying something of a come back. Many of his works that had fallen out of print have been published in new editions since the turn of the century, (Bergson 2004; 2005) and a number of commentaries have appeared, along with a number of conferences. (Burwick 1992; Guerlac 2006; Mullarkey 2006 and 2011) In the early years of the 20th century, when Bergson's works were being translated into English, the philosopher William James said admiringly that Bergson had "killed intellectualism definitively and without hope of recovery. I don't see how it can ever revive again in its ancient Platonising role of claiming to be the most authentic, intimate, and exhaustive definer of the nature of reality." (Burwick 1992:4) To Burwick and Douglass, the eclipsing of Bergson in the mid 20th century suggests a disturbing possibility: "that his work is a repressed content of modern thought." (Burwick 1992:7) Indeed, although Karen Barad does not mention Bergson once throughout her book, as we shall see, his ideas seem to underpin much of what she suggests, and even provide deeper understanding than she fathoms.

This author acquired a vintage 1944 edition of Bergson's masterwork, *Creative Evolution*, in the late 1990s, which, alongside Burwick's commentary, formed the philosophical grounding of my PhD (Kreps 2003). Of particular note for this paper, however, is Bergson's treatise on *Matter and Memory* (1896 – published in a new edition in 2004), in which he puts forward his views on the nature of perception and memory, and their impact upon our understanding of the nature of matter and spirit. Let us take these one by one.

Perception

In *Matter and Memory*, Bergson first addresses the nature of perception, how the senses give us access to the world around us. Acknowledging immediately that he is describing an extreme which is never apparent, he outlines what he terms 'pure perception' in order that when it is mixed back into the reality of our experience, we can better understand how and why it acts in the way it does.

Pure perception, in other words, doesn't happen, but is posited in order to describe one end of a fluid spectrum, with 'pure memory' at the other end.

The objective world around us includes one very special object that plays a dual role – our body. The body is the exception in all our perceptions, which we perceive both from the outside – looking at it – and from the inside – our 'affections'. "I examine the conditions in which these affections are produced: I find that they always interpose themselves between the excitations that I receive from without and the movements which I am about to execute." (Bergson 1896:1) In other words, for Bergson, perception and action are a continuum with our affections in the middle. He examines the body focussing on the two-way traffic of the nervous system: centrifugal and centripetal. He takes issue with the Enlightenment conception that representations of the outside world exist within our minds. For this to be the case the entire material universe would have to exist in our heads, which it plainly does not. The brain is part of the material universe, not the other way around. He asserts, therefore, that the body is "a centre of action" (Bergson 2004:5) – "an object destined to move other objects" – which, because it can perform *new* actions, "must occupy a privileged position" with regard to other objects. The body's perception of the external world, moreover, is directly relevant to what actions are possible: "The objects which surround my body reflect its possible action upon them." (ibid p7) Cut the nerves which convey this information, and the rest of the body, and the external universe, remain, although perception entirely vanishes. There is, then, an objective reality outside of the body. Cutting the nerves merely stops the flow of information from the periphery back to the periphery, via the centre, and no more possibilities of action appear. "Here is something which concerns action, and action alone." (ibid p7)

Perception, moreover, is concerned directly with action in a way which selects and isolates what is relevant, or *useful*, and ignores that which is not. This *usefulness* is key to understanding Bergson's description of perception: our relationship with the objects we perceive is directly related to what actions we may or may not perform in relation to them – from what is good to eat to what we need to avoid bumping into. As Hacking maintains, then, albeit in the context of a 'realism towards entities' Barad sees as essentialist, "That which exists is that which we can *use* to intervene in the world to affect something else." (Barad 2007:41 my emphasis).

Objective reality, then, in which, as science describes to us, objects relate to one another according to rules we can deduce from them, continues without regard to us. The fact that this objective world appears to be different according to the subjective perspective of each of us does not, however, present any paradox: our subjective perception of these objects has isolated that which is *useful* to us about them, and ignores that which is not. Therefore, "there is for images merely a difference of degree, and not of kind, between *being* and *being consciously perceived*." (ibid p30).

Memory

Pure memory, on the other hand, does not partake in action – by definition. There are, for Bergson, two forms of memory. As he puts it, “The past survives under two distinct forms: first, in motor mechanisms; secondly, in independent recollections” (ibid p87). Thus there is the form of memory which can perhaps best be understood as habit – something which has been learned and need no longer be conscious; and another form of memory which brings to consciousness distinct recollections of specific events. The two differ fundamentally with regard to action: the former indeed is more properly understood as part of the present, an action in the now that the body has recorded through practice; the latter exists only in the past, has no engagement with action or the body in the present. The distinction is crucial. One might understand habit e.g learning by rote, making automatic, as a memory. But each individual time that we go through something in order to learn it is also an individual memory. There is a distinction therefore between what we have learned to repeat – as a motor mechanism – and what we simply remember because we did it, because it happened. The former, in fact, “no longer *represents* our past to us, it *acts* it; and if it still deserves the name of memory, it is not because it conserves bygone images, but because it prolongs their useful effect into the present moment.” (ibid p93).

Human memory is different from, for example, that of a dog wagging his tail to greet his master: “To call up the past in the form of an image, we must be able to withdraw ourselves from the action of the moment, we must have the power to value the useless, we must have the will to dream. Man alone is capable of such an effort.” (ibid p94). Memory, for Bergson, is not an object retrieval system, but a temporal field of awareness, which can expand or contract depending on requirement. In short, “in the degree that these recollections draw nearer to movements, and so to external perception, the work of memory acquires a higher practical importance. Past images, reproduced exactly as they were, with all their details and even with their affective colouring, are the images of idle fancy or of dream : to act is just to induce this memory to shrink, or rather to become thinned and sharpened, so that it presents nothing thicker than the edge of a blade to actual experience, into which it will thus be able to penetrate.” (ibid p130).

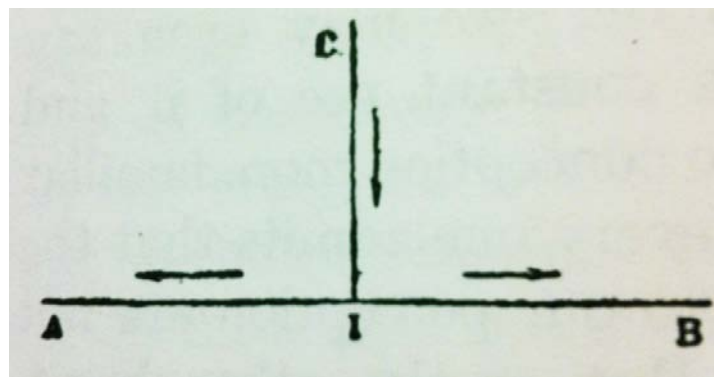
So, in sum, the present – pure perception – is about consciousness of the body. The past – pure memory – is about unconsciousness of the body, the realm of fancy and dream. The reality of the human condition is always a blend of the two. Memory, in the human being, is something which gives the flow of our perceptions from periphery through the centre to periphery, the possibility of choice. We can pause, in the centre of action which is our body, and compare the motor mechanism action ready to react to our perceptions with previous ones, in our memory, and weigh up the pros and cons of different outcomes. We may, indeed, choose not to act at all, which is where Bergson refers to the ‘virtual’ – actions that are potential, neither occurring, nor merely memory.

Herein lies the combination of perception and memory which constitutes the norm, as opposed to the extreme forms of ‘pure perception’ and ‘pure memory.’

What we actually perceive, then, is always a mixture of the 'pure perception' coming to us from our senses, ready to translate into action, and the images from memory that we project upon the object we are perceiving, pausing action for the possibility of choice.

Matter and Spirit

Thus the nature of *matter* is placed neither exclusively in the 'realist' world of objectivity (what our senses perceive), nor in the 'idealist' world of sensation (what our memory projects). It is, perhaps, neither, or both. Bergson calls matter "the aggregate of images, and perception of matter these same images referred to the eventual action of one particular image, my body." (ibid p7). But the nature of matter is crucially bound up with the nature of time and space, and it is here perhaps that Bergson's most significant contribution to philosophy resides.



To help us to understand his thoughts, Bergson frequently turns to very simple graphs, by which he sketches out the relations between concepts. The above is a scan of one from his 1896 book, *Matter and Memory*. He outlines the relation between space and time thus: "Our perceptions, actual and virtual, extend along two lines, the one horizontal, AB, which contains all simultaneous objects in space, the other vertical, CI, on which are ranged our successive recollections set out in time. The point I, at the intersection of the two lines, is the only one actually given to consciousness." (ibid p183-184)

The survival of the past, by which memory is possible, is therefore not physical. It is not in the brain. It is not – cannot be - contained by the body. "The fundamental illusion consists in transferring to duration itself, in its continuous flow, the form of the instantaneous sections which we make in it." The past does not cease to exist, it ceases to be *useful*. It is wrong to define the present "as *that which is*, whereas the present is simply *what is being made*." (ibid p193.)

Bergson is emphatic about this, using an extraordinary image to present his case: "In the fraction of a second which covers the briefest possible perception of light, billions of vibrations have taken place, of which the first is separated from the last by an interval which is enormously divided. Your perception, however instantaneous, consists then in an incalculable multitude of remembered elements; and in truth every perception is already memory. *Practically we perceive only the past*, the pure present being the invisible progress of the past gnawing into the future." (ibid p194)

The brain, then, cannot be physically storing memory. "Itself an image, the body cannot store images, since it forms a part of the images; and this is why it is a chimerical enterprise to seek to localise past or even present perceptions in the brain : they are not in it; it is the brain that is in them. But this special image which persists in the midst of the others, and which I call my body, constitutes at every moment, as we have said, a section of the universal becoming. It is then the *place of passage* of the movements received and thrown back, a hyphen, a connecting link between the things which act upon me and the things upon which I act, - the seat, in a word, of the sensori-motor phenomena." (ibid p195)

What, then, is our consciousness, our memory, our agency? It can only be something on the other side of a dualistic conception of existence: on the one side matter, on the other, spirit. Yet unlike any other dualistic conception of existence, these two are never apart, never distinct, always indissolubly concurrent, coexistent, and coterminous. The very moment this dualistic conception of existence is posited, as it were, it is immediately merged into a monistic conception. Here it is then that the two ideas for which Bergson is most famous emerge: *durée réelle* - the real duration at the point 'I' in the above diagram, experienced by our consciousness as it rides the unfolding universe at the fulcrum of past and present; and *élan vital* - the vital spark which drives it.

In Bergson's view, human experience does not perceive real life as a succession of demarcated conscious states, progressing along some imaginary line, but rather as a continuous flow. Duration, the constantly growing and expanding totality of the past as time unfolds into the future, is perhaps his most key concept. Bergson pointed out a distinction between the concept and experience of time: to Bergson, time is presented to consciousness as duration - an endlessly flowing process. This is analogous to Latour's notions of linear and spiral time (Latour 1993). Bergson argued that 'real time' (*durée réelle*) is experienced as duration and apprehended by intuition, not through separate operations of instinct and intellect. He claimed that real time can never be grasped through common scientific methods. To Bergson, it is intuition, the direct apprehension of process, which is the discoverer of truth - intuition, not analysis, reveals the real world. Material objects do not exist separate from a 'fourth dimension' of time, in which events involving these objects occur, but time and matter are indistinguishable, the flow of unfolding evolution is the continuous movement of a space-time whole that is quite simply not divisible.

Bergsonian sociomaterial agential realism

Can we, then, construct an approach to contemporary technology that affords the materiality of knowledge described by Orlikowski, the diffractive agential realism of Barad, and the ontological insights into the nature of matter, perception, memory and spirit given by Bergson?

To begin with, Orlikowski's understanding certainly begins to look quite different through a Bergsonian lens. For Bergson objects relate to one another according to the rules of science, and are understood by us according to their relation to our bodies. We isolate the aspects of objects that are useful to us, in the way that

we perceive them – just as Barad emphasises occurs in scientific experiments in quantum physics. So when technologies "vanish" in our human-centred approach it is those bits which are irrelevant to that approach; and when social context vanishes from a techno-centric approach it is the old realist position that cannot account for consciousness, and therefore excludes (as Barad would put it) and ignores it. Reading the dichotomy between Orlikowski's techno-centric and human-centred approaches to technology through the ideas of Bergson, we find the dichotomy is overcome by seeing it as a difference in degree, not in kind. As Latour asserts, it is the division that is the artefact. (Orlikowski 2006:462).

But what of Orlikowski's notion of the scaffold: is it simply too spatial? Certainly it could be read as a spatialising act, a pre-existing linguistic concept that limits our understanding. But there are also, in her description of it, many elements of duration. The temporary, emergent, contingent and changing nature of scaffolds are the most important elements to her description of their usefulness. Perhaps if we conceive the final building, once the scaffolding has been taken down, actually as simply a longer lasting scaffold for human activity that takes place within it, our more durational appreciation of the notion of scaffolding would be freed of 'object-hood' and allowed back into the continuous flow of the *durée réelle*. Indeed, thinking of the material instantiation of all the technological achievements of society, from the briefest scaffold of interlocking tools, skills and materials to the most solid stone edifice, and maintaining a durational understanding of all these objects – how even a stone building may change from temple, to quarry, to trophy, to tourist attraction, situated always in a nexus of cultural contexts – then we might conceive of our technologies as scaffolding that augments human activity, enables us to share aspects of the social beyond the space and time our bodies inhabit. As Orlikowski suggests, "Knowing in practice is materially scaffolded with technological artefacts," and "these scaffolds ... are performed by human agency." (2006:465).

Secondly, it will by now be clear to the reader that much of Barad's assertions may sit squarely within the Bergsonian universe, despite the fact that she never mentions him. Nor am I the first to notice such correlations. Iris van der Tuin's paper in the early months of 2011 in the feminist philosophy journal, *Hypatia*, reads Barad and Bergson diffractively through one another finding numerous linkages and correspondences. Importantly, she sets aside and to rest the erroneous assertions of one feminist, Rebecca Hill, that Bergson's work is somehow phallogentric, setting a masculine spirit in a dominant position over a feminine matter (van der Tuin 2011:25). Such an approach is clearly to profoundly misunderstand Bergson and to fall prey to precisely the kind of misconceptions which he seeks to overcome.

As pointed out above, Barad concludes "the heart of the lesson of quantum physics" is that "*we are a part of that nature that we seek to understand*" (Barad 2007:26 my emphasis). Here we can clearly see Bergson's accent upon the nature of the body as a centre of action, and the concomitant impossibility of consciousness, memory, images existing within the brain, for the brain exists within them; thus deeper still than Barad's understanding of quantum physics Bergson shows us not only that we are a part of that nature that we seek to

understand but where, ontologically, that which seeks to understand may be placed, in a wider, dualistic conception of existence that, once such a duality has been conceived, immediately reunites it, coupling matter and spirit in a monistic and coterminous totality.

Further, when Barad asserts that, "The assumption of thingness remains in place at the base of Hacking's entity realism" and argues that "realness does not necessarily imply thingness" (ibid p56), she indirectly suggests the process-based, durational understanding of reality in Bergson's core concept of the *durée réelle*. Indeed, as van der Tuin asserts, "reading Bergson and Barad diffractively," (van der Tuin 2011:28), produces many correlations.

But Barad's suggestion that performativity gives us a better way to understand matter brings her most firmly into the Bergsonian world view. Bergson's understanding of habit memory versus pure memory provides the ontological and material understanding underpinning how Butler's notion of citationality actually works in practice. Citationality is habit memory, the performance of pre-existing roles learned by rote in the material-discursive milieu of one's social context. (Butler 1990;1993) Foucault's disciplined bodies have had motor-mechanism training in pre-determined performances. To live in the present, reacting as truly as possible to immediate perception without recourse to such learned behaviours, is indeed to grasp at the possibility of escape, as Foucault enjoins us to, particularly in his later works (Foucault 1990). Butler's account of matter as "a process of materialisation that stabilises over time to produce the effect of boundary, fixity, and surface we call matter" (Butler 1993, 9) chimes perfectly with Bergson's durational flow wherein consciousness and matter work hand-in-hand, and which for Barad produces the "unsettling of nature's presumed fixity" (Barad 2007:64) that she associates with Bohr.

Now, Bergson's formulation of the intuitive, as the primary means by which we truly grasp reality, might be seen to differ from Barad's onto-epistemological description of a diffractive reality constituted by agents and material-discursive practices. But van der Tuin argues Bergson's intuition and Barad's onto-epistemology diffractively compliment one another. She shows Bergson's intuition is actually an onto-epistemology, and Barad's onto-epistemology is actually intuitive: "Bergson states that "the mechanism of our ordinary knowledge is of a cinematographical kind" (Bergson 1907/1998, 306;), which is to say that we take snapshots of a flowing reality that are then strung together in order to set ourselves to an understanding of movement." In his famous essay *Introduction to Metaphysics*, continues van der Tuin, "Bergson claims that this is an illegitimate move, predicated on spatialized time, with which we will never approach true movement or the flow of duration (Bergson 1934/ 2007)." (van der Tuin 2011:35) In keeping with Paul Virilio's concept of picnolepsy, our experience of the rapid shift from still image to still image is actually an experience of movement. This teaches us that "movement is to be found when "grasping it in the aggregate" and not when we, habitually and intellectually, are seduced "to divide up the film image by image" (Bergson 1934/2007, 7)." As van der Tuin remarks, quoting another commentators words, this posits a "direct equation of the epistemological with the ontological, collapsing our knowledge of

the thing with its being” (Grosz 2005, 123). She concludes that this makes Bergson’s understanding of duration distinctly onto-epistemological. “The intuitive method now can be said to be an onto-epistemology.” Turning the argument around, and examining Barad’s Bohrian approach, van der Tuin finds the same correlate, concluding that “Onto-epistemologies, on the other hand, can be said to be intuitive.” (van der Tuin 2011:35)

Augmented Memory - media-rich agential reality in durée réelle

It is not only Bohrian quantum theory that supports Bergson’s world view. Other more recent scientific developments continue to support his ideas, and, as we shall see, the virtual layer of rich media that is beginning to spread between us and reality is readily apprehended in Bergsonian terms.

In keeping with Orlikowski’s assertions that knowledge is embodied, neuroscience has in the past decade become fascinated with the discovery of mirror neurons (Rizzolatti and Craighero 2004; Kilner et al 2009). The mirror-neuron mechanism is a neurophysiological mechanism that appears to play a fundamental role in both action understanding and imitation. Significantly, “Mirror neurons discharge not only during action execution but also during action observation” (Kilner et al 2009:10153). In other words, our brains, as centres of action, perceive the external world in terms of response, whether that response is actualised or not. This is entirely in keeping with a Bergsonian understanding of the brain as a centre of action. The mix of perception and memory in our experience of the world, moreover, is underlined by another group of neuroscientists (Llinás 2001; Gregory 1968, 1998) who assert that much of our experience of the external world is projected. Llinás, indeed suggests that the brain evolved because organisms needed to move around without running into other organisms or objects (Grandin 2005). Gregory asserts that, “Perception seems, then, to be a matter of ‘looking up’ stored information of objects, and how they behave in various situations.” (Gregory 1968)

Without relying only upon Bergson’s own use of very early neurological studies in the late 19th century, but asserting that even contemporary neuroscience continues to support his arguments, setting aside any feminist criticism of his work as having missed the point, and seeing clearly the close correlations with the contemporary work of such writers as Karen Barad and Wanda Orlikowski, this paper, then, in sum, posits a Bergsonian agential realism, that informs a sociomaterial understanding of our relation with the technological artefacts that populate our world, including new technological developments, which we must now turn to.

Smartphones, or mobile internet devices, have enjoyed phenomenal growth in the latter part of the first decade of this century. By 2012 sales of such devices are predicted to outstrip sales of PCs, and by 2015 more people will be accessing the internet with such devices than they will be with a PC. (Meeker et al 2010) One of the primary drivers of this growth is the revolutionary Apple iPhone which continues to have a huge advantage over its cheaper (and already more numerous) rivals - its integrated App Store in iTunes. Apps - small applications

which run on the iPhone OS - have become a primary revenue source for Apple, whose mobile business already outstrips its computing business. (Naughton, 2010). Some 4bn total individual downloads of iPhone Apps had taken place by 2010. (Meeker et al 2010).

Key to the growth and popularity of such devices has been the convergence, not just of telecomms and photographic equipment, which helped drive mobile phone sales, and the addition of internet access, which defined the smartphone, but the addition, following the success of in-car satellite navigation devices, of GPS receivers into mobile internet devices. The integration of GPS technology into smartphones, coupled with the consumer-led approach of Apple's iPhone, gave birth to a whole new class of location-based services for mobile internet devices, available in particular for the iPhone, but also for Android, and other devices. Often incorporating mapping technologies that can help users to find, mark, explore and record precise locations, services such as Foursquare, RunKeeper, Layar, Yelp and others allow users to access, explore and publish activities based upon their geo-location. Geo-social applications, focusing on the social-networking possibilities of location-based services, have also thrived.

These location-aware social networking apps – even Facebook, taking the lead from Foursquare, now enables its mobile users to register the 'Place' from which they are posting - and the camera-based applications such as Layar and others which act as directory enquiry services providing information on commercial services such as restaurants etc. in the immediate locale, collectively represent a new generation of mobile internet device services. Layar in particular, at the time of writing, is becoming a platform for niche layers, as much as an application in itself.

Although these camera-based apps are often quoted as the primary examples of it, Augmented Reality Applications, as they are often described, could arguably also include such apps as Foursquare, which provide tips on what to do at your location submitted by other Foursquare users, and thus by implication, any number of other GPS applications.

The study of the mobile digital cultures arising from the proliferation of mobile internet devices is clearly a very new but very rapidly expanding arena. As Pederson argues, "The launch of Apple Inc.'s iPhone in the United States [in 2007] was more than a new product release; it was a cultural event." (Pederson 2008). Interestingly, as Hawk et al (2008) point out in their introductory essay to their edited volume, *Small Tech: the Culture of Digital Tools*, (Hawk et al 2008), there is an issue of power at stake in the hardware miniaturisation inherent in mobile digital culture. In keeping with Foucault's analysis of the power/knowledge matrix (Foucault 1977, 1990a), "Small tech....extends power to include the fragment, the individual, the corporation, and the network ... The power of the network not only allows corporations to capitalize on it but also allows anyone connected to it to utilize and ultimately affect the network." (Hawk et al 2008:xi). But this not a utopian vision. "This doesn't mean ... that power relations are equal.....Power in the era of small tech is increasingly available, but it is also increasingly uneven." (Hawk et al 2008:xi). The

Foucauldian implications of power relations are not, however, the focus of this paper.

Most interesting for the concerns of this paper, however, is how the various kinds of Augmented Reality (AR) applications might be conceived philosophically, and what their impact on our everyday experience might be, or become. Famously repeated has been Nicholas G. Carr's assertion that "Google is making us stupid." (Carr 2008). The argument suggests that our own ability to remember, think through, work out, or otherwise exercise our own minds is somehow challenged by our growing tendency to simply 'google' the answer. One might suggest, in fact, that this is a trend which began with the pocket calculator, and which AR will make far worse! However, in light of our discussion of Bergson, and how his ideas underpin Barad's Bohrian ontological understanding of our relation with the world, and Orlikowski's sociomaterial approach to understanding our use of technology, we might by contrast suggest that this trend, from use of the pocket calculator, through googling to the coming integration of AR into our daily lives, represents not a 'dumbing down' of our ability to use our own minds, but an extraordinary expansion of our own memories into something we might term: collective memory. This collective memory, which has for so long been restricted to books and journals accessible only to the few, and requiring a good deal of time and effort to access, is increasingly becoming immediately available to all with a mobile internet device, sorted for us by location to be useful in situ. Augmented Reality, in short, might better be understood as Augmented Memory.

With augmented reality and other location based services becoming an increasingly important part of our lives, will daily and intensive use of this 'augmented memory' offer us a virtual layer to sociomaterial agential reality that we will incorporate deeply into our sensori-motor-mechanism habit-memory - making our reality media-rich? Will this virtual layer, this 'scaffold' of technological apparatus and material-discursive practices, overwhelm us with further 'intellection' and drown out our ability to apprehend the present in a properly durational manner? Instead of looking at and experiencing the flower in the field, will we rather experience it through the viewfinder of our smartphones with the Latin name and a range of other information displayed in helpful info-boxes around it? Will this layer, in contrast perhaps, grant us, as we become used to it, a much more ephemeral sense of the 'real,' that will help us let go of our fixation upon fixity?

One such application enables children to see cartoon dinosaurs climbing out of their book in the family home (Mash & Martin 2010). Will we come, in time, to view such virtuality, as any the less 'real' than the 'fixed' objects our bodies suggest to us are more tangible? I believe the answer is already before us in the 'reality' we ascribe not just to the fictional characters upon our screens, but to those we have for millenia imagined in our mythologies - deities and sprites who appeared before us in the woodlands, whose 'virtuality' appeared to us no less 'real.' As such, our knowledge of these 'virtual' characters - be they woodland sprites or info-graphics upon our smartphone screens - if that knowing is as *material* as Orlikowski would have us believe, must suggest to us an

understanding of the material that stretches into the 'virtual' as understood by Bergson, where mirror-neuron activity is perhaps all the action that can be discerned of a Bohr-Barad phenomenon that is potential, but which is not made. In this way, the media-rich layer promised by augmented memory becomes a durationally understood virtuality between action-perception and dream-memory, a materiality that could even be regarded as an exemplar of the sociomaterial.

Conclusion

Thinking the social and natural together, and taking account of *how* both factors matter, we have looked to the ideas of Bergson to underpin more recent theorising at the junction of old and perhaps outworn perspectives on the 'material' and the 'social', and found them not unlike the 'wave' and the 'particle' that reveal themselves to us when we look at matter in our modern scientific laboratories – dependant on which apparatus we use. Using the visual metaphor of diffraction, with Haraway, Barad and van der Tuin, we have attempted to read "insights through one another in ways that help illuminate differences as they emerge: how different differences get made." (Barad 2007:30). We have also tried to focus our attention away from the spatial toward the durational.

We have examined ideas of the Virtual – particularly the Bergsonian notion of potential action and the contemporary parallel in mirror-neuron response without action, and suggested that these ideas present us with an understanding of augmented reality as augmented memory. We have examined ideas of the Phenomenal, using Barad's account of Bohr's understanding of flux as opposed to thingness, and seen Bergson's notion of duration within it. We have addressed from both an onto-epistemological and an intuitive standpoint notions of the Real, and addressed outworn concepts of realism with material-discursive and sociomaterial understandings, and Bergson's notion of the *duree reelle*, which unite the cultural and the natural, the real and ideal, the social and the material. Finally, we have looked to the contemporary reality of the Mobile, and posited the possibility of a Bergsonian augmented memory, that in the flux of a complex Orlikowskian scaffold of Bohr/Barad apparatus may present us with a new layer of media-rich collective memory at the fulcrum of the old divisions.

Lastly, then, I wish to conclude with Bergson's philosophical method as essentially one which sees in a theory of knowledge the awareness of the limits of intellect, an understanding that an intellectual grasp of the universe is necessarily limited to the extent of our knowledge, almost a humility that acknowledges the unknown and the unknowable in this vast universe. Once acknowledged, it is then the task of a theory of *life*, in tandem with a theory of knowledge, to attempt to see beyond those limits, to see how they originated, how they may be expanded. The two theories should spiral around one another, chasing each other into ever deeper and broader awareness. (Bergson 1944:xxiii-xxiv) Bergson's project was to begin that theory of life, and Deleuze and others since have enjoined us to continue it.

His concept of the *élan vital*, ("creative impulse" or "living energy",) which he argues lies at the heart of evolution, in place of the Darwinian concept of natural selection, shows perhaps most clearly how Bergson's is a monist philosophy, a re-unification of the sundered worlds of Nature and Culture. Importantly, Bergson is explicit in stating that this *élan vital* is a force whose existence cannot be scientifically verified – a crucial break from the traditional 'substantial' vitalists who contended that there must be some fluid or other organic material at the spring of life. These earlier vitalists also believed that there must be some divine force outside of matter, driving it. Bergson's *élan vital*, however, is a property of matter itself, consistent with the reconception of the material inherent in the concept of the *durée réelle* – that is, that material objects do not exist separate from a 'fourth dimension' of time, in which events involving these objects occur, but that time and matter are indistinguishable, that the flow of unfolding evolution is the continuous movement of a space-time whole. Perhaps the media-rich virtual layer of augmented memory we are building for the coming century will help us to appreciate it better.

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