Techné:
Research in Philosophy and Technology

Joseph C. Pitt, Editor-in-Chief

Peter-Paul Verbeek, Editor

Pieter Vermaas, Editor

Techné: Research in Philosophy and Technology

CONTENTS

The Public Thing:
On the Idea of a Politics of Artefacts

Mark Coeckelbergh
Department of Philosophy,
University of Twente

Abstract

Is there a politics of artifacts, and if so, what does it mean? Defining the issue as a problem about the relation between the human and the non-human, I argue that our common philosophical concepts bar us from an adequate understanding of this problem. Using the work of Hannah Arendt and Bruno Latour, I explore an escape route that involves a radical redefinition of the social. But the cost of this solution is high: we would lose the metaphysical foundation for our belief in the absolute value and dignity of humans. We should pay that prize only if we gain a better understanding of what we are doing and what we want to do together – with things.

Keywords: Politics of artifacts, non-humans, the social, Arendt, Latour

Introduction

In 1980, Langdon Winner made a famous argument about the relation between politics and artifacts. He suggested that bridges leading from New York to the beaches of Long Island were intentionally designed so low as to keep poorer people (many of them Afro-Americans) out: they would use public transportation, but buses could not pass under the bridges (Winner 1980). Although Winner's interpretation turned out to be counterfactual (Joerges 1999), the story illustrates that artifacts *can* have political consequences, whether or not such consequences are intended. As Verbeek puts it, things *do* things (Verbeek 2005). In this sense, there can be something like political studies of artifacts: empirical studies of the political consequences artifacts have.

I suspect, however, that the problem is not sufficiently explicated and described by such an approach. In order to understand what is at stake, we must track down the problem's roots, roots that reach deep into the conceptual resources of our culture. In this essay, I reflect on the relation between politics and artifacts by defining the issue as a conceptual problem concerning the relation between the human and the nonhuman. I argue that the philosophical concepts we use bar us from an adequate understanding of the politics of artifacts and of related notions such as the idea of a technological culture. Although many philosophers of technology have paid attention to the consequences of things and have developed new concepts to discuss this issue (for instance Heidegger, Ihde, and Borgman – for an overview see Verbeek 2005), few have drawn the full implications for our conception of the social. Hannah Arendt and Bruno Latour are an exception. Using their work, I will explore a route towards a politics of artifacts that involves a radical redefinition of the social that transgresses the human/non-human boundary. I give the example of humanoid robots to illustrate the approach. However, I also show that the price to pay for this solution is high.

Humans and Things

Much of our modern thinking assumes a strict distinction between humans and artifacts. Consider dualisms such as freedom and necessity, humans and things, subject and object, and spirit and matter. On this view, a 'politics of artifacts' is a contradiction in terms. Politics has to do with human affairs, with society, not with things. There is no conceptual space for a politics of artifacts.

Let me first clarify the problem by using Arendt's work. In *The Human Condition* (1958) Arendt makes a distinction between labour, work, and action. Let me limit my summary of these distinctions to a brief description of work and action. Action is what politics is about: it is about speech, about acting in the public sphere. Work, by contrast, is the making of things, artifacts. It is a label for the sphere of technology – understood as the *techne* of craftmanship, not as industrial production, which resembles the process-character of labour – different from the sphere of politics. With words we reveal who we are, with words we give shape to the collective, which in Arendt is defined as the *polis*, that is, a political community. Thus, there is a strict distinction between humans and artifacts, between words and things, between the creation of meaning (culture) and the making of objects (technology), between political subjects that speak and mute objects that are in no way part of the political.

Bruno Latour has described this as a problem of the separation between things and humans (Latour 2004, p. 36), nature and society (p. 37), matters of fact and matters of concern (p. 22), risk-free objects and a risky social order (p. 22), facts and values (p. 30), the external world and the prison of the social, the ahistorical and the historical. Latour's concern is with a politics of nature; the main problem he addresses is the possibility of a political ecology. My concern in this paper is the politics of artifacts. Where are artifacts located in these conceptual schemes? Do they belong to nature? No, because they are human-made. Do they belong to the human, cultural sphere? No, because they are objects, not subjects. They do not speak. Thus, holding on to these distinctions, there is no way in which we could conceive of a politics of artifacts or related terms such as a technological culture. Both are, within this framework, contradictory terms. Neither do they fall within the categories Arendt distinguishes and wishes to separate, nor do they correspond to the distinctions Latour discerns and wishes to criticize.

In order to conceive of a politics of artifacts, then, we must move beyond the dualisms built into our thinking. But what does this 'going beyond' imply? Does it mean that we 'bring artifacts into politics' or 'bring politics into artifacts'? That seems a 'natural' response to Winner-type demonstrations. Politics must be concerned with artifacts, since they have political consequences. But is this response radical enough, given that our thinking is saturated with the conceptual distinctions outlined above? How radical should our conceptual change be?

Towards a Politics of Artifacts

Let me argue why we must go further than 'bringing artifacts into politics' by drawing on Arendt and Latour again.

While Arendt's distinction between work and action certainly represents the conventional dualisms outlined above, *The Human Condition* offers another view of technology as well, which I shall summarize as the claim that things act politically. To construct my interpretation, let me select two arguments from Arendt.

First, the political needs things, since they build a common world. Influenced by her teacher Heidegger, Arendt notes about the public realm:

> To live together in the world means essentially that a world of things is between those who have it in common, as a table is located between those who sit around it; the world, like every in-between, relates and separates men at the same time. The public realm, as the common world, gathers us together and yet prevents our falling over each other, so to speak. What makes mass society so difficult to bear is not the number of people involved, or at least not primarily, but the fact that the world between them has lost its power to gather them together, to relate and separate them.' (Arendt 1958, p. 52-53)

Thus, technology is necessary for action. The 'community of things' gathers us together (p. 55). Common sense needs common things.

Second, the political does not only depend on things, but things become also political. In this argument, Arendt understands the broader, cultural significance of technology. Although Arendt identifies politics with speech and big deeds, at several places in the book she supports exactly the opposite view: technology speaks and does things; technology has great political significance. This is already apparent in her (often disregarded) prologue, which starts not with the story of a 'political' deed but the story of a 'technological' deed: the launch of Sputnik. For Arendt, this launch is yet another event that marks our efforts to escape the earth. Since elsewhere deeds and events are identified with political action, we are led to conclude that Arendt's example demonstrates not the silence of technology, as she suggests, but its scream: a loud voice calling for escape from the earth. Of course this is not meant literally; Arendt argues that technology assumes a political dimension – 'political' understood in an Arendtian sense as action and speech.

However, a more explicit acknowledgment of the political role of artifacts can be found in Chapter 6. Here we are offered another technological story – a term that would be contradictory according to Arendt's distinction between work and action: the story of the telescope. She locates the invention of that instrument at the beginning of the story of modern culture, which she interprets as a story of alienation. The telescope changed our way of thinking, since it made us treat the earth from outside, from an Archimedean point (Arendt 1958, p. 262). With the help of technology, Arendt argues, modern man has 'removed himself from the earth to a much more distant point than any Christian otherworldliness had ever removed him' (p. 320). The implication of this story is that technology is viewed as having a political role. What scientists did and do in 'the unseen quiet of the laboratories' turns out 'to have greater news value, to be of greater political significance, than the administrative and diplomatic doings of most so-called statesman' (p. 324). Work and action (understood in an Arendtian way) are blended in the political significance of things. Technology acts. I conclude from Arendt that artifacts are 'public things': they gather us together and change the world and our thinking.

Interpreted in this way, Arendt is entirely in line with Latour. Latour has studied 'the unseen quiet of the laboratories' and concluded that what happens there is of the highest political significance and should be of political concern to us. He is known for the Actor-Network theory, according to which both things and humans are *actants*. In *Reassembling the Social* (2005) he tries to re-define the social and in *Politics of Nature* (2004) he provides a systemic account of what he calls a 'political ecology'. Here I will use the latter work, which offers clearer arguments directly relevant to my topic.

Having rejected the dualisms mentioned above, Latour proposes a new conception of the social. Rather than having an 'outside' nature separated from society, he proposes a 'one-house' collective (Latour 2004, p. 37). There is no longer a separate 'assembly' of things and an 'assembly' of humans, no two separate worlds of scientists and politicians. As an example he mentions the Kyoto 'conclave' (which made the climate treaty), which included facts and concerns, scientists and politicians (p. 56). Both the issues we are now dealing with (such as global warming) as well as the parties involved (scientists and politicians) require a different conceptual framework. There is one collective that mobilizes, recruits, and domesticates new nonhumans. Neither scientists alone, nor politicians alone can resolve the issues (p. 38). This also changes the meaning of the term 'discussion': 'speech is no longer a specifically human property,' nature is no longer mute (p. 65). Things speak. There are spokespersons that represent all kinds of entities, whether scientific or political. Things are no longer 'objects', since they make a difference, speak, provide value, animate actions, and give form to humans (p. 88). A different vocabulary has to replace that of facts and values (p. 111). There is no longer a fact-value distinction; there is no longer a nature separate from culture or society. The challenge is to incorporate new nonhumans in the collective, and to live together with them. In this conclusion of *Reassembling the Social* he summarizes this task: the progressive composition of one common world (Latour 2005, p. 254).

This renders Latour's conception of the social very different from that of Arendt. For Arendt, the social is a deplorable mix of categories that should have been separated (labour, work, and action). She writes about what she calls 'the rise of the social': the emergence of 'that curiously hybrid realm where private interests assume political significance that we call "society"' (Arendt 1958, p. 35). In Arendt's modernism, hybrids are to be avoided. In Latour's amodernism, there are many hybrids (Latour 1993), and we are urged to adapt our concepts to that reality.

Hybrid Politics: Intelligent Robots

A new hybrid that may illustrate the approach suggested here is the case of intelligent robots that interact with humans. Consider companion robots, pet robots, household robots, care robots, sex robots, military robots, etc. Although such robots are only just emerging, they provide an interesting case, since they are more explicitly 'political' than many other artifacts. If they are really going to be part of our daily lives, as some scientists predict, then this raises the question of how to live together with them.

Now if we took the 'old' approach, we would have to see them as 'mere things', as objects that stand in sharp contrast to our human subjectivity. The political consequence we would probably take is to see them as slaves. This is what we have done with some animals, women, and other entities that we (first) considered as nonhuman (not-man). In this case, there could be only a Winner-type politics of artifacts, for instance concerned with who gets access to such robots (most probably the rich). Such discussions are necessary and useful, but they do not touch the more fundamental problem regarding the relation between the human and the non-human. The Arendtian-Latourian alternative I sketched above has the ambition to tackle that issue. The way in which intelligent humanoid robots may be 'political' in Arendt's and Latour's sense is that they can have a significant impact on our thinking and on the way we live together.   First, intelligent robots may change our self-definition as humans, especially if they resemble us in some ways. In the West, we typically define the human by distinguishing ourselves from non-humans, for example animals and machines. We insist that we are not ('merely') animals and not ('merely') machines. These self-definitions tend to follow scientific and technological developments. For instance, Darwinism has forced us to re-define ourselves. Today we typically define ourselves in

relation to computers. It is likely that in the near future we will define ourselves in relation to intelligent humanoid robots. Thus, just as the telescope or space travel is related to wider cultural change and change in thinking, some robots may have the potential to play an equally significant 'political' role. In this (Arendtian) sense, they might 'act'.

Second, such robots are likely to have a more direct impact on 'politics' in the sense that their introduction into society is likely to change the way we live together. This is a two-way process. For instance, today the development of care robots is often justified by reference to financial considerations, which are linked to our conception of elderly care and of society. Once such robots are introduced, they then change our practices of care and, ultimately, our conceptions of living together. Politics, then, becomes a hybrid realm that includes humans and non-humans such as robots.

Thus, both Arendt's suggestions about the political and cultural significance of technology and Latour's political ecology go beyond Winner's or – to some extent – Verbeek's approach.[1] According to my interpretation of Arendt and Latour, the question concerning the politics of artifacts is not merely and not only about what political consequences a particular artifact has in a particular context; it concerns the more fundamental question of how to redefine politics itself.

Note that in my interpretation of Arendt and Latour, to say that artifacts 'speak' and 'act' has a specific meaning that is different from ascribing *agency* (e.g. Floridi and Sanders 2004) or *intentionality* (Kroes 2002; Verbeek 2008) to things. Some artifacts can both 'speak' and 'act' in Arendt's or Latour's sense; perhaps some future intelligent robots that have both great cultural significance and become part of the political sphere. But most things that 'speak' and that have political significance (in Arendt's or Latour's sense) lack *agency*. Consider the telescope Arendt refers to: it cannot be called an agent by any description, but it has 'acted' in Arendt's sense. Agency is not required for things to join the collective, to gather us together or to change the direction of our culture. Moreover, while the collective and the politics is hybrid – consisting of things and humans – the entities themselves need not be hybrid or have 'hybrid intentionality' (Verbeek 2008). One should not confuse the claim concerning the hybridity of the social with claims about cyborgs and other hybrid entities.

Note also that this approach to robot politics is very different from giving (some) robots rights. If we want to do that, we have to engage in discussions about whether or not robots have agency or whether or not they are political or moral subjects. Within the alternative conceptual framework, the politics of artifacts has no need to bother with such tiresome debates. It has replaced the old political concepts with new ones. The subject-object distinction is no longer the most relevant distinction here. The question is whether or not, and how, to draw robots into the social sphere, the collective. Giving robot rights is merely the opposite of enslaving them. The conception of one collective reaches beyond such master-slave choices.

In my experience, this approach is rather close to, for instance, the way Japanese culture tends to view humanoid robots and the distinction with humans. One scientist told me that he simply does not understand why the human/non-human distinction is as relevant as we (in the West) think it is. And Latour argues that his approach is close to that of non-Western cultures. These remarks, by themselves, do not constitute an argument for the approach. Moreover, cultures are neither homogeneous nor static, there is no sharp Western/non-Western divide and all cultures are always (a) modern to some extent. However, these comments signal that there is much to learn from empirical anthropology – not in order to glorify difference or to indulge in exoticism, but in order to fine-tune the suggested conception of a politics of artifacts. If it is hard for us to imagine the

social as one collective, rather than a sphere of humans (culture) as opposed to a sphere of non-humans (nature), then this is so since we are used to a modern metaphysics that separates both spheres. It can be enriching to engage with views that view human/non-human relations differently and that have a different blend of modern and amodern elements than our own. Of course this may not lead us to change our view. The social metaphysics proposed by Latour is hard to swallow. I return to this issue below.

The Cost

Imagine we are attracted to the above sketch of a politics of artifacts as a redescription of the political. Are we fully informed about its costs? Are we prepared to pay the philosophical bill? Before drawing conclusions, let me provide some consumer guidance.

The dualisms rejected by Latour are not exclusive to the issue of a politics of artifacts, but form the basis of much of our moral and political thinking, in particular modern thinking and humanist thinking. The human/nonhuman distinction as a metaphysical distinction, the freedom/necessity dualism, the nature/society dualism, the fact/value distinction – without them, modern philosophy but also humanism would be quite lost. Let me limit my discussion to one issue only. Rejecting the dualisms, as Latour does, means that we would have to let go of the metaphysical foundation of our belief in the absolute value and dignity of humans. It means letting go of humanism. For instance, it is only on the basis of a strict human/non-human distinction that we can say that humans 'as such' should have alienable rights. An entirely amodern and non-humanist culture (if such an idea is intelligible at all) could know moral concern for human suffering, but would not voice this concern by using the human/non-human distinction.

Just as the existentialists declared that we must draw and accept the full consequences from the death of God (Sartre 1946), I suggest that post-humanists will have to draw the full consequences from the death of the human – the decline of the belief in the human as the superior entity in the universe metaphysically separated from non-humans. Can any human face that *Angst*? Or should post-humanists continue to live 'inauthentic' lives in 'bad faith': live *as if* their humanist notions are adequate, while they should know better?

Perhaps the *Angst* can be mitigated by taking an historical and cross-cultural approach. It may be a consolation to know that, just as there have always been people who were very well able to live their lives without monotheism, there always have been people who lived their lives without humanism. So if such lives are *possible*, maybe existential *Angst* should be replaced by the demand to make a judgment about what way of living and what way of living together is preferable, better.[2] This, certainly, is a responsibility we cannot escape. It is the moral and political question itself.

But why should we become post-humanists? And should we want to be amodern in the first place?

Conclusion

Arendt's notion of politics excludes artifacts, and Latour's analysis of the distinction between nature and society shows that that distinction leaves no room for conceptualizing the political significance of artifacts. However, in their own way both authors offer elements that allow us to conceptualize a veritable *res publica*: the 'public thing'. Things act and speak. The crucial move that makes this concept of a politics of artifacts possible is a redefinition of the social as one

hybrid sphere, one collective in which there is place for both humans and non-humans. Whether or not we embrace that concept, both authors provide good arguments for the existence and necessity of a politics of artifacts. There is already a hybrid common world to some degree. It is now up to us whether or not we are prepared to draw the consequences from this and (re)conceptualize that world. Both Arendt and Latour challenge us to expand our political imagination. But how far are we prepared to go? If we join Arendt, we might initially be under the impression that we can retain our modern framework, but soon find out that her thought is closer to Latour than we might have expected. If we follow Latour's line of thought, we most certainly have to part with our dearest dualisms on which we have founded our modern (and humanist) beliefs. We might want to pay the prize only if it allows us to gain is a better understanding of what we are doing and what we want to do together – with things. But that is the criterion. And if we're unsure what direction to take, there is at least this consolation: according to Latour, uncertainty is one of the main characteristics of the new politics.

Acknowledgments

References

Arendt, H. 1958. **The Human Condition**, Chicago/London: The University of Chicago Press.
Floridi, L and Sanders, J.W. 2004. "On the Morality of Artificial Agents", *Minds and Machines* 3: 349-379.
Joerges, B. 1999. "Do Politics Have Artefacts?", *Social Studies of Science*, 29: 411-431.
Kroes, P. 2002. "Design Methodology and the Nature of Technical Artefacts", *Design Studies*, 23(3): 287-302.
Latour, B. 2005. **Reassembling the Social: An Introduction to Actor-Network-Theory**, Oxford and New York: Oxford University Press.
Latour, B. 2004. **Politics of Nature**, Cambridge, MA/London: Harvard University Press.
Latour, B. 1993. **We Have Never Been Modern**, trans. C. Porter, Cambridge, MA: Harvard University Press.
Sartre, J.-P. 1946. **L'existentialisme est un humanisme**, Paris: Nagel.
Verbeek, P.-P. 2005. **What Things Do**, Pennsylvania: Penn. State University Press.
Verbeek, P.P. 2008. "Cyborg Intentionality: Rethinking the Phenomenology of Human– Technology Relations", *Phenomenology and the Cognitive Sciences*, 7(3): 387-395.
Winner, D. 1980. "Do Artifacts Have Politics?", *Daedalus* 109(1): 121-136.

Endnotes

1   Verbeek's post-phenomenological approach is in fact more radical than that of Winner since it involves a redefinition of the relation between subject and object. Latour wishes to go beyond the subject-object distinction itself. However, I will not further discuss the differences between Verbeek and Latour.
2   Amodernism or post-humanism does not engage in post-modernist celebrations of difference combined with the refusal to make moral judgments and comparisons. For a start, it judges modern culture to be deficient, and Latour explicitly rejects the view that non-modern cultures are better than ours by definition.

How to Understand Nano Images

Tore Birkeland
Department of Mathematics,
University of Bergen, Norway
and
Roger Strand
Centre for the Study of the Sciences and the Humanities,
University of Bergen, Norway

Abstract
Nanoscale objects are presented by ever more sophisticated pictures (nano images). There is a need to reflect on the status of such nano images, because the "seeing" involved is of a highly indirect kind. The aim of this paper is to complement existing philosophical critique of nano images with a scientific practitioner's perspective. First, we show some reasons to consider seeing and imaging as complex endeavours not only on the micro and nano scale, but also on the macro level. Secondly, we argue that practising scientists are not only accustomed to interpret pictures and other graphical presentations of data as being partial and simplified, but that simplification is deliberate and internal. Rather than requiring that "true" images have to be representational (Pitt 2004, Pitt 2005), the paper advocates for the fruitfulness of understanding and judging images by the amount and nature of the information they convey. Scientific literacy could be improved by creative development of visualization techniques, but also by improved public understanding of images and their correct and cautious interpretation.

Keywords: Nanotechnology, Images, Ethics

Introduction

In recent years, scientific texts as well as more general literature have come to include ever more sophisticated pictures in the presentation of research on nanoscale objects (nano images). The most common equipment for studying materials on the atomic scale, are the Scanning Tunnelling Microscope (STM), Atomic Force Microscope (AFM) and similar probing microscopes. The development of the design of pictures produced by the STM has been described by Hennig (2005). Designs have emerged that "show" individual atoms, and it is our experience that it has become common to describe such pictures by saying that one "sees" the atoms, both in regular scientific discourse and in instances of science policy discourse. A striking example was provided by the European Commission (2004).

There is a need to reflect on the status of such nano images, because the "seeing" involved is of a highly indirect kind that requires extensive data processing under a number of theoretical and experimental assumptions. Indeed, Pitt (2004, 2005) has argued that nano images should not be considered images in any ordinary sense of the word, and that they "do not allow us to see atoms in the same way that we see trees" (Pitt 2004, p. 157). Furthermore, most nano images show atoms as well-defined dots or spheres in orderly arrays, and hence, he argues, convey an idea of nanoscale phenomena as orderly and controllable. Accordingly, he concludes that claims to see or represent atoms by nano images are both epistemologically and ethically suspect, since they may mislead the public about the difficulties and complexity of nanotechnology.

We agree with Pitt that the ethical questions are important, and that the risk of misguidance in public debate and policy-making must be addressed. The issue being a difficult and complex one, we believe it to be important that different perspectives be brought into play and interdisciplinary exchange. The first author is a mathematician and atomic physicist. The aim of this paper is not to reject the analysis of nano images provided by historians and philosophers of science, but rather to complement these perspectives with that of a practising scientist in the nano field.

From this perspective, the paper argues that the epistemological status of nano images within scientific research is less problematic than what appears to be argued by Pitt (2004, 2005). First, we show some reasons to consider that seeing and imaging always implies some filtering of information, even on the macro level. Secondly, we argue that practising scientists are not only accustomed to interpret pictures and other graphical presentations of data as being partial and simplified, but that simplification is deliberate and internal, if not constitutive, to research practice. Philosophically, such claims are hardly novel, but we think they are important in the context of nano images since they have bearings on how to address the ethical challenges. We fear that it will be futile to try to police or otherwise influence scientists' and others' use of the words "image" or "seeing"or to convince them to use less powerful graphics. Rather, misguidance should be fought by offering citizens and policy-makers the intellectual resources to interpret the images correctly and cautiously. It is the objective of the paper to make a contribution to this effect by explicating how scientists think and reason about nano images.

Seeing in the Macro World

In Pitt's argument weight is given to the difference between what it is to see something (and to have an image of it) in the macro and nano world, respectively. His claim is that we do not see or have images of atoms in the same way as we do with macroscopic objects such as trees. Hence, when nanotechnologists and others claim to see atoms and produce nano images, it represents a change of meaning of these terms, a change that he finds illegitimate.

There are obvious reasons to claim that such differences exist, but we find the claimed illegitimacy of the increased extension of the terms "seeing" and "image" debatable. We see at least two routes to pursue that debate. One might address it along the lines of the debates about scientific realism, which ultimately appears to be Pitt's choice, although he does not proceed into the technicalities of that debate within the more analytic strands of philosophy of science. Typically, that route leads to an emphasis on the difference between the "indirectness" of access and empirical evidence to decide on the truth about micro and nano level phenomena, and the "directness" and readiness of our access to the truth about macro phenomena. The other alternative is a praxeological one, to reflect upon the practicalities involved in seeing and imaging both with respect to macro and nano world. In this paper, we will attempt to pursue the second route. The purpose is then not to decide or focus upon truth status, but rather to point out some similarities between the practices of nano and macro seeing and imaging. We think that these similarities constitute extenuating circumstances that are important to the consideration of the legitimacy of the claims to see and image atoms. In certain traditions of philosophy of science, pejoratively described by Hacking (1983) as "the spectator's view of knowledge", the tendency has been to downplay the importance of the complexities of seeing and imaging in the macro world in order to arrive at general ideas of one-to-one correspondence between scientific theory and reality, and image and object. We find it important to emphasize, however, that from a *scientific* point of view, the relationships between image, seeing and object is not straightforward even on the macro scale.

We would like to address some of these complexities from what we might call the practising physicist's point of view. A first noteworthy observation from this perspective is that seeing of any kind infers some filtering of information, some of this filtering is deliberate, while some filtering is inadvertent and unavoidable. The deliberate filtering is what we learn through infancy for recognizing objects; filtering out inconsequential information like background lighting, partially occluding objects, etc. The unavoidable filtering is a more fundamental limitation of human vision, and is related to what we possibly can see. Seeing something with the naked eye is inherently limited, as our eyes only convey information about a small part of the electromagnetic spectrum. . This leaves many objects more or less invisible, such as the air, glass and clean water, where if the eyes conveyed information about a different part of the electromagnetic spectrum, e.g., infra red or x-ray radiation, these objects could be all from clearly visible to opaque. Furthermore, even in the visible range of the electromagnetic spectrum we can not possibly see every detail due to the limited resolution of our eyes.

The only way to "see" features outside the visible range is to use techniques mapping the desired information back to the visible range, such as provided by a microscope, or an infrared film. This constitutes, as argued by Pitt (2004), a change in the meaning of seeing, as it extends the metaphor of seeing to include the details of handling of the instrument. However, from a physicist's point of view, it seems arbitrary to give light in the visible range a special status, given the very successful theory of electromagnetic radiation. Visible light gives some information about an object, and that information is directly accessible to the human eye. However, it certainly does not give a full account of the object, and for many applications, the important features might not be conveyed by visible light at all. It is not that seeing through an x-ray machine or a microscope is the same as seeing a tree, but one should be careful about elevating a small part of the electromagnetic spectrum to convey more *essential* information about an object.

Imaging the Macro World

Pitt (2005) argues that in order for a visual construction to be called an image, it must be representational of the original object. Requiring something to be representational implies some comparison with seeing both the object and the image.

As argued above, seeing an object always involves filtering out irrelevant and inaccessible information. Creating an image requires in the same sense some kind of filtering. However, in the process of creating an image, the filtration is more deliberate, and one always has a choice of which features to convey and which to filter out. Consider a digital photograph as an example. Taken with default camera settings in a sufficiently lit scene, a photograph must surely be said to be representational of the scene. The fact that it was taken with a digital camera which post processed the raw data to adjust white balance, remove noise and correct for visual aberrations due to the lens does not, according to Pitt's arguments, stop it from being an image. It is still a faithful representation of the original scene. However, if the photograph is modified on the computer, it becomes less obvious if it still can be called an image. How much can it be modified before it ceases to be an image and becomes a visual construction? Some adjustments of the colours are relatively safe. After all, the camera has already done this by mapping the sensor data to a white balance setting. Removing red eyes and adjusting brightness and contrast will probably also be allowed even though it changes the information in the image, as long as it does not alter any of the important features of the scene. Adjusting the brightness and contrast too much will leave the entire image completely black or white. At that point it will certainly cease to be an image, as all the important features have been filtered out.

The choice of what information to convey is even more clear when imaging objects outside the visible range, such as in x-ray photography. It is not immediately apparent what makes an x-ray photograph representational, as matter does not reflect x-rays exactly like visible light, and we cannot observe the x-rays directly. However, it is this observation that makes x-ray photography useful. It provides a different subset of information about the imaged object that cannot be observed directly. It would be pointless to try to make an x-ray photograph look as much as an ordinary photograph as possible. Rather, one should make the x-ray photograph such that it conveys information about interesting features that cannot be observed directly in order to compliment ordinary photographs.

One might extend this analysis further. Indeed, the legitimacy of the adjustments of the digital photograph (and also in classical, "analogue" photography) is not independent of the act of seeing that is supposed to be the reference. Hence, removing "red eyes" makes the photo more in accordance with what is seen by the human eye of a spectator or the photographer, while keeping the red eyes provides us with a representation of the objects (eyes) at the split-second peak of light intensity during the exposure time. Hence, there is no unique "truth" about whether eyes are red or not without specifying the details of lighting and observation. The photographer producing the image, however, has to choose: either he keeps the red eyes or he does not. In either case the choice constitutes a filtering of information, and the image will always be a representation of less complexity than the real object.

Any faithful description of the practices of imaging needs a concept of filtering and of necessary and relevant information. Difficult choices must be made between the more or less relevant and the more or less important details. With concepts of importance and relevance, however, come questions such as "Important or relevant for whom?" and "Important for what?" Which features are considered important cannot be expected to be universally accepted, but will in general depend on the purpose the images are created for. As an image cannot possibly be expected to hold all information about an object, one must accept some loss of information. This loss of information can be attributed to some filtering performed in the course of the entire process of creating the image. Some loss of information may be accidental and unimportant. For example, if one is to take a photograph of a tree, it might not be of importance that the sky is overexposed, and no details of the clouds can be observed. If one is to photograph the same scene for the purpose of studying the clouds, however, the overexposed sky would not convey the important features of the scene, rendering the image useless. And, as hinted at in the example of the red eyes, certain methodological choices make it possible to faithfully reproduce certain features at the expense of others.

These crude examples are certainly simplifications, but the problem of keeping a sharp distinction between what is an image and what is not is present and increasing with the complexity of the instruments used. With more complex instruments, more knowledge is required to interpret pictures, and thus also the validation of their status as representational images. A requirement of images to be representative typically either becomes unattainable (or irrelevant, since one most often does not *want* images with an undiscriminated, maximum amount of information), or some arbitrary standard must be set in the form of certain viewing conditions. Accordingly, it appears more fruitful to put the emphasis on the requirement to convey some important features of specific objects. The quality of the image would then be a matter of the value (relevance) and the quality of the information, to be judged in terms of its reliability and validity. Visual inspection will often be important in assessing reliability and validity, but not always; and it is not always the best method.

Imaging on the Nano Scale

Above, we have presented an argument against an understanding of seeing objects that grants seeing an unproblematic epistemic status, seeing things "as they are", "directly". We have then argued in favour of an understanding of images and visual constructions that places more emphasis on the notion of information rather than seeing. We believe this to be fruitful when trying to explicate the scientific practitioner's point of view. This is even more so when we discuss objects on the nanoscale, which cannot be seen in the ordinary sense of the word. We will pursue this by discussing how visualizations on the nanoscale are designed to carry information and hence can be considered images in our sense.

From its the discovery, scientists have used numerous models for visualizing the atom. From the scientific practitioner's point of view, a visualization technique is not developed with the intention to provide a representation of what atoms really look like. The visualizations are viewed as illustrations to show certain aspects of the system. This can be linked to how the atoms were discovered. Atoms were not discovered because they were observed directly in a large microscope. Rather, some phenomena in chemistry (i.e., the Law of multiple proportions) could not be explained by assuming that matter is continuous and can in principle be subdivided an infinite number of times. Atoms did not need an appearance, because they were postulated to be too small to be observed directly. They were therefore associated with circles, spheres or later: clouds; not because this was what they really look like, but because this choice conveyed information about some of their properties. They served as simple illustrative tools that allowed the scientist to refer to some of the atomic properties more efficiently.

This changed with the introduction of the STM in the 1980s, as researchers claimed to be able to see individual atoms as they really were, with theoretical electron density cloud as an intermediate step on this path. There is, however, still a problem with the meaning of what atoms look like.

Asking what something looks like, is asking to compare it so something else of which the visual appearance is already known. This works trivially for macro scale objects, where recognizing objects as similar to others is an important part of learning to see. It even works well for recognizing objects in a microscope, because micro scale objects reflect and transmit light in the same fashion as micro scale objects. However, trying to directly compare nano scale objects to macro world objects is a problematic endeavour, as atoms, while being the building blocks forming the matter that we see, do not react in a similar way to electromagnetic radiation when studied individually. In fact, an atom changes state by emitting a photon, and thus it cannot be expected to have the same appearance if it emitted another photon before first absorbing another. As atoms do not behave in the same way when they are isolated as they do collectively, one can argue that they do not relate to anything directly accessible to our senses at all.

If electromagnetic radiation cannot be used to see atoms in the same way as a tree or a cell through a microscope is seen, can atoms be said to have any appearance at all? Certainly not in the same sense that a tree have an appearance, but they may have some properties that can most efficiently be conveyed visually. Like an x-ray photograph, images of atoms should not be expected to be like images of trees; but rather convey some important properties of the specific atoms that are studied.

In the same respect, the STM visualizations can be called images, because they represent at least some of the important properties of specific atoms, namely the conductivity of vacuum near the surface of a conducting sample. Other probing microscopes use different techniques to make

images of other features of the atoms. An Atomic Force Microscope (AFM) uses a laser to detect minuscule changes in force applied to a cantilever as it is moved over a surface. Other probing microscopes use other techniques to map out the surface of a sample. If one were to apply different techniques to the same sample, the images produced would in general not be identical; they would highlight different properties of the studied atoms. One could argue that this difference means that one cannot be certain what is a correct representation of the atoms, and thus that the images produced are not images at all. On the other hand, one can again make the comparison with x-ray photography. Pictures taken of the same object with a normal and an x-ray camera, will certainly not be identical. They will not convey the same properties of the objects photographed, which is probably why x-ray photography was used in the first place. In the same sense, AFM and STM images will probably not portray the same features of the sample, but they are images in the sense that they represent some of the features of the sample.

It boils down to an example provided by Pitt (2005), where one is to map out a stone wall with a very accurate device shooting tennis balls at the surface. One should then detect the angle of deflection as they bounce back and visualize the data. Pitt seems to be sceptical to call the result of such an endeavour an image. To the argument presented here, the other hand, it represents some of the important properties of that specific wall, and could thus be called an image. It would be an image of the mechanical reflective properties of the wall, in contrast to a photograph, which would be an image of the reflective properties for electromagnetic radiation in the visible part of the spectrum.

Important Features

As discussed above, the phrase *"important features"* implies some use of the images. One can therefore not discuss the status of images without also looking at how the images are used. As what is regarded an important feature cannot be expected to be universal, but rather dependent on the use of the images, and more importantly, the background knowledge of the intended recipients, one should not try to present STM images in a similar manner to a diverse audience. A material scientist working with STM images daily certainly knows a lot more about the use and limitations of the STM instrument than an average member of the public. This implies that what might be considered the important features of an STM image will most likely not be the same. The untrained public eye might see a 3D STM image, and compare it to pictures of a jagged mountain range. By making such comparisons, one can easily be led to attribute other features to the nano world than just visual similarity and thus be led to believe that on the nano scale, the world is solid and controllable, or – in physical jargon – *classical*, while, according to Pitt *"The world at the nano and quantum mechanical level is a buzzing, shifting, constantly in motion in non-linear and non-classical causal fashion" (*Pitt 2005). This kind of simplification has received criticism from several authors (Pitt 2005, Nordmann 2004 and Robinson 2004) for conveying a simplified image of the nano world where "everything is under control". Pitt suggests that one should not try to show a simplified view of the nano world to the public, but rather try to convey its complexity and thus create more sympathy for the difficulty involved in nano science in the public. However, simplifications are an essential part of physics; trying to understand something about nature by creating a simplified model that carries some important features of the studied phenomenon. In that sense the STM images fit nicely into common practice in physics. It highlights some of the properties of a sample such as structure, at the expense of neglecting other properties deemed not interesting for the current study. Even if this practice is common in physics, it does not change the fact that it may confuse the public, or others without the necessary knowledge to understand the limitations of STM imagery. Therefore, it is very important to accompany the images with information about how they were created, what the limitations of the

instrument are, which features are considered interesting by the creators, and also why it was represented in this specific way.

Colours, shadows and other lighting effects on the nano scale are clearly artificial, in that they do not exist in the same sense as in the macro world. However, as previously argued, atoms do not have any obvious visual form, so any visual representation can be called artificial in that sense. One can therefore argue that using colours, shadows and other 3D effects is not problematic in itself, as long as it highlights important features of the image. While the reason for choosing certain colours and other visualization effects may have been obvious to the creator of the image, it certainly will not be obvious to an average member of the public. Most people have not seen many STM images, and more importantly, they have never *learned* to see the nano world. However, in a world where nano technology is increasingly becoming mainstream, and blockbuster movies portraying a completely unrealistic image of nano technology, it is crucial to teach people to see nano images for what they are, and not a small step from Drexlerian machines.

Advanced visualization techniques certainly have their place in science, and it is impossible to prohibit the use of such images when conveying information about nano science/technology to the public. We believe it to be equally futile to fight against the term "image" and "imaging" and insist on calling them visual constructions; indeed, this paper argues that it is reasonable to call them images. Independent of terminology, however, scientific citizenship in the 21st century requires an understanding of not only the phenomena studied by science and the technology developed from it, but also of the practices of scientific knowledge production and dissemination, including how scientists communicate in words and graphics. This social learning process should involve scientists, citizens and scholars who study science engaging in mutual, interdisciplinary critical discourse (see e.g. Goodsell 2006 for a good example). Creativity is also needed, for instance in the development of visualizations (above all movies) that convey non-classical, probabilistic, fuzzy and/or chaotic features of nanoscale phenomena. Accompanying text that explains the making and limitations of images may also be useful. With the apparent growing know-how and understanding of digital imaging techniques among young people, we are not too pessimistic in this respect.

References

European Commission 2004. **Nanotechnology – innovation for tomorrow's world**. Brussels: European Commission, Directorate-General for Research. Publication EUR 21151 EN.

Funtowicz, S. O., Ravetz, J. R. 1990, **Uncertainty and Quality in Science for Policy**, Dordrecht: Kluwer.

Goodsell, D. S. 2006, "Seeing the nanoscale", *NanoToday*, 1, 44-49.

Hacking, I. 1983. **Representing and intervening: Introductory Topics in the Philosophy of Natural Science.** Cambridge: Cambridge University Press.

Hennig, J. 2005, "Changes in the Design of Scanning Tunneling Microscopic Images from 1980 to 1990", *Techné: Research in Philosophy and Technology*, 8:2 Spring

Kellman, P.J., Arterberry, M.E. 1998, **Cradle of Knowledge: Development of Perception in Infancy**, MIT Press

Nordmann, A. 2004, "Nanotechnology's worldview: new space for old cosmologies." *Technology and Society Magazine,* IEEE, 23, 48-54

Pitt, J.C. 2004. "The Epistemology of the Very Small," in: Baird.D, Nordmann, A., and Schummer, J., eds, **Discovering the Nanoscale** eds. Amsterdam: IOS Press, 157-163.

Pitt, J.C. 2005. "When is an image not an image?" Techné: Research in Philosophy and Technology, 8:3 Spring, 23-33

Robinson, C, 2004, "Images in NanoScience/Technology," in: "Discovering the Nanoscale" eds. Baird.D, Nordmann, A., and Schummer, J., Amsterdam: IOS Press, 157-163.

Technological Paradigm in Ancient Taoism

George Teschner
Philosophy Department,
Christopher Newport University
and
Alessandro Tomasi
Rhode Island College

Abstract
Heidegger, Winner, and Ellul's critiques of Western technology focus on a notion of efficiency that subordinates to itself all non-instrumental values. An alternative conception of efficiency is proposed based on the Taoist theory of non-action (wu-wei). The ancient Taoist text, The Chuang Tzu, reveals a type of efficiency that is effective, resourceful, and entrepreneurial. It is a form of action which has an intimate rather than alienated relation to technology, and which is sensitive to the ethical and aesthetic values that Heidegger and Ellul claim are excluded from the Western conception of efficiency.

Keywords: Taoism, Technology, Efficiency, Chuang Tzu, Heidegger, Ellul, Embodiment.

Introduction

Modern Western technology has been criticized by thinkers like Heidegger and Ellul for placing the value of efficiency above the beautiful, the good, and the holy. The danger of which Heidegger and Ellul speak is the subordination of art, morality, and religion to technological forces, where all values become secondary to instrumental value. Efficiency, however, plays a central role in the writings of ancient Taoism, particularly the *Chuang Tzu*, in which there are numerous images of efficient action. One of the most interesting and provocative is that of the butcher Cook Ting who cuts up oxen by effortlessly moving his knife without hitting ligaments or tendons. There are hollows and spaces, Cook Ting explains, that offer no resistance. He claims, as a consequence, it has not been necessary for him to sharpen his knife in 19 years, even after cutting up thousand of oxen. By comparison, he says, cooks that cut and hack need to change their knife often.

Cook Ting is contrasting two different kinds of technology and technique. Both types of cooks are effective in cutting up oxen, in the sense of getting the job done, but Cook Ting is efficient as well, for the absence of resistance minimizes effort and maximizes effectiveness. The graceful and rhythmic movements of Cook Ting, were observed by a ruler who remarked that in watching Cook Ting he had "learned how to care for life," thereby elevating efficiency to a central principle of living. (Chuang Tzu, 47). In the Taoism of Ancient China, efficiency is not associated with the dehumanizing effects of technology. It is a different concept of efficiency than the one usually associated with machine technology. The alternative notion of efficiency in Taoist literature implies a radically different view of rationality and its relation to action than that found in Western culture. The value of efficient action in Taoism does not require limitation from without by moral, aesthetic, and religious values. On the contrary, efficiency demands a fitting-in with non-instrumental values that is the path of least resistance necessary to effectively achieving any end. The efficiency that finds itself in harmony with these non-instrumental values is

effective, while the efficiency that sets itself in conflict with them fails to achieve anything but the loss of the human and the destruction of what is natural.

The Criticism by Ellul

The principle on which modern technology depends is that the value of any means is reducible to how efficiently it does what it is meant to do. Jacques Ellul captured this reduction in his definition of technology as "the totality of methods rationally arrived at and having absolute efficiency… in every field of human activity" (Ellul, xxv). Contemporary technology manifests itself as a totality of means characterized by absolute efficiency, and not by the end it is meant to serve. Absolute efficiency is absolute in two senses. It is absolute in so far as it aims at achieving the end in the most efficient manner, that is absolutely efficient, and it is also absolute in the sense that all other values are subordinate to it, that is, efficiency is absolute. The reduction of value to instrumental value is such that the user of the tool becomes judged by the same criteria used to value the tool. The machine reinforces instrumental thinking to the extent that the machine regulates human action. The controller becomes the controlled and must think like a machine to function in a mechanized environment. Clocks and calendars are machines that regulate human life, and when lives are so regulated, they tend to become as mechanical as clocks and calendars themselves.

The mechanization of human life is the result of recent developments in the relationship between technology and economic production. The history of technique is the history of the search for absolute efficiency, and technique, as the ensemble of means to achieve absolute efficiency came into its own only with the industrial revolution (Ellul, 52-53). In the more historical section of his *The Technological Society*, Ellul explains that up to the nineteenth century, "the search for greater efficiency… played a role, but it was one factor among several" (Ellul, 73). Other factors would range from the aesthetic to the religious, ethical, and political. It is only with the Industrial Revolution of the nineteenth century that "society began to elaborate an exclusively rational technique which acknowledged only considerations of efficiency" (Ellul, 73). Before that, technique was constrained first by the Greek concern with self-control, and then by Christian morality and the humanism of the 16th century. Technique was, thus, subordinated to life and culture including moral and aesthetic concerns. Today, on the other hand, technological progress "is no longer conditioned by anything other than its own calculus of efficiency" (Ellul, 74).

The example Ellul offers to illustrate this preoccupation with the aesthetic aspect of tools is the increasing diversification of designs in sword making.

> It was impossible to conceive of a tool that was not beautiful. As for the idea, frequently accepted since the triumph of efficiency, that the beautiful is that which is well adapted to use—assuredly no such notion guided the aesthetic searchings of the past…. On the contrary, aesthetic considerations are gratuitous and permit the introduction of uselessness into an eminently useful and efficient apparatus. (Ellul, 72-73).

The 19th century freed technique from its aesthetic constraints and brought about an aesthetic subordinated to efficiency: "A style then developed based on the idea that the line best adapted to use is the most beautiful" (Ellul, 73). Streamlining in the design of automobiles is an example of this development. This is the origin of the modernist principle that form follows function.

The same happened with "moral flourishes" (Ellul, 74). The invention of the steam-powered engine brought such an enormous increase in productivity that moral considerations could not limit its use. The increase in the efficiency of weapons only forced people to find more "creative tactics of self-justification" (Lienhard, 139). It was more properly the case that a moral system had to be found that would justify the adoption of more and more efficient machineries. The paradoxical nature of atomic weapons, by the use of which, differently from any normal means, "every end will be destroyed together with the entire world in which 'ends and means' have existed" (G. Anders, in Mitcham et al. 132) did not stop the invention and use of them. Ellul puts it this way: "Technique never observes the distinction between moral and immoral use. It tends, on the contrary, to create a completely independent technical morality" (Ellul, 97). Quoting Jacques Soustelle, Ellul reminds us of a basic law guiding technology: "Since it was possible, it was necessary" (Ellul, 99).

Ellul's explication of the history of technology as a process of reduction of all values to the value of efficiency does not end with a solution. As technology becomes more autonomous, human beings lose the power to control it, and thus end up being controlled by it. Not surprisingly, then, the most Ellul offers is an invitation to "transcend" technological determinism "by an act of freedom" (Ellul, xxxiii), not to check and guide technology, which to think possible is "vanity" (Ellul, 428), Ellul suggests that we approach technology with a consciousness built on experience, and possibly face it with acts of resistance, such as we find in modern environmentalist movements. Ellul's acts of freedom that transcend technological determinism must be understood against the background of his theological commitments. His solution is at best the familiar subordination of technological value to a value system that is outside it, which in Ellul's case is some form of religious transcendence that is higher than the ethical and aesthetic.

The Criticism by Winner

Langdon Winner's solution is that problematic technologies should be "taken apart with the expressed aim of studying their interconnections and their relationships to human need" (Winner, 330). This method is, he writes, "one way of recovering the buried substance upon which our civilization rests." This "buried substance" consists of that "original understanding of technology as a means that, like all other means available to us, must only be employed with a fully informed sense of what is appropriate. Here, the ancients knew, was the meeting point at which ethics, politics, and technics came together" (Winner, 327). [1] Again, we find, as in Ellul, the conception of a historical change, from an "appropriate" technology to one that departed from its original meaning. An appropriate technology is one that satisfies ethical, political, technical, and, aesthetic conditions. For Winner, this broader understanding of techné has, over time, narrowed down to a technological lifeworld whose defining characteristic is greater and greater efficiency.

Technology is a problem for Winner in the same way Frankenstein's monster was a problem for Dr. Frankenstein. Dr. Frankenstein's creation is the embodiment, in fiction, of Winner and Ellul's autonomous technology. Like Frankenstein's creation, modern technology presents "the perils of

---

[1] Winner and Ellul are not the only philosophers complaining about the detachment of the technological from the ethical, the aesthetic, and the political. Francois Lyotard characterized Western technology as blindly following "the principle of optimal performance: maximizing output and minimizing input" (Lyotard, 44). This principle marks also a reduction of the range of technological concerns to efficiency. "Technology is therefore a game pertaining not to the true, the just, or the beautiful, etc., but to efficiency: a technical 'move' is 'good' when it does better and/or expends less energy than another" (Winner, 44).

an unfinished, imperfect creation" and points to "the continuing obligation of the creator" to care for it (Winner, 309). The pattern is the same:

> At the outset, the development of all technologies reflects the highest attributes of human intelligence, inventiveness, and concern. But beyond a certain point, the point at which the efficacy of the technology becomes evident, these qualities begin to have less and less influence upon the final outcome (Winner, 313-4).

At this point, when a technology proves its efficiency, its human creator lets go of it. The creator is not concerned with the consequences of its efficient application relative to an already existing milieu.

> It is at this point that a pervasive ignorance and refusal to know, irresponsibility, and blind faith characterize society's orientation toward the technical. Here it happens that men release powerful changes into the world with cavalier disregard for consequences; that they begin to "use" apparatus, technique and organization with no attention to the ways in which these "tools" unexpectedly rearrange their lives…. (Winner, 314).

The drive towards absolute efficiency manifests itself fully: "One only wants the technical thing to be present in its utility" (Winner, 315).

According to Winner, people shaped by the paradigm of "narrow utility" (Winner, 327) and fully driven by the search for the ideal of absolute efficiency will not feel any discomfort about the direction technology is taking. On the contrary, they will celebrate human creativity and ingenuity, and will not hesitate to dub religious objections as superstitions, ethical doubts as irrational fears, and aesthetic concerns as obsolete. Part of Winner's solution involves a democratic critique of new technologies. As he argues, new technologies should be "intelligible to nonexperts" and highly conditional and provisional so that they can be rejected if proven harmful. We should give priority to those technologies that tend to make their human users least dependent on them (Winner, 326-7). Still, the "supremely important step" (Winner, 327) is to change our relation to technology and abandon "narrow utility" in favor of a broader conception of efficacy that involves political and ethical considerations. It is this broader sense of what is proper that allows a critical evaluation of new technologies, according to Winner.

Implicit in both Ellul's and Winner's solution to technology is the assumption that technology can be rationally controlled, objectively appraised, and morally evaluated. In both cases this optimistic rationalism is tempered by an appreciation of the historical momentum of Western technology and its power to shape values and perception and consequently to make very difficult adopting a neutral and objective attitude towards it. Heidegger, by contrast, takes this limitation further and regards technology as the defining worldview of Western civilization making it impossible to stand outside it except under extraordinary circumstances which now will be shown to go far beyond rational critique and moral evaluation.

The Criticism by Heidegger

This concern with an unbalanced relation between efficiency and other values is found in Heidegger's notion of the "single manifold" (Heidegger, BW, 316). According to Heidegger, techné originally involved an experience of the coming together of usefulness (*techné*), beauty (*poesis*), truth (*aletheia:episteme*) and holiness (*promos*). A successful, effective adoption of a

technique or tool occurred only on condition that all four aspects of the single manifold were present. In this sense, a useless, but beautiful object effects a disintegration of the single manifold, which upsets the relationship between the human and the tool. Just as the useful is not to be separated from the beautiful, art does not belong in museums, because it is then artificially disengaged from the world of the useful and the holy. According to Heidegger, modern, Western technology is a *Gestell* that reveals as resource whatever comes within its interpretative view. In a purely instrumental *Gestell*, things are valued exclusively for their usefulness. The danger lies, in reducing techné to mere instrumentation.

The remedy to this reductionism is to see techné as art, not as the art that is merely memorialized in museums, but as *poiesis*. Heidegger's notion of the single manifold is meant to show us the four basic existential conditions comprising technical praxis. These conditions are not qualities of the object, but relational aspects belonging to the meeting of the human and the machine. The tool has to be beautiful, in the sense of not violating aesthetic sensibility. It has to be useful, in the sense that it has to perform its function efficiently. It has to be true, in the sense that it has to "bring forth into the splendor of radiant appearance" the realm of possibilities inherent in the use of the technological artifact. Finally, it has to be holy in the sense that it allows for "the safekeeping of truth," of the lived, experiential revelation of what the tool brings forth in the realm of possibilities (BW, 315-316).

Heidegger and the Turning

Heidegger's single manifold is not an invitation to return to a golden epoch, which is not in our power or even desirable to retrieve. The saving power is already embedded in our present understanding of Being as dominated by the search for efficiency for its own sake. Heidegger suggests that a "free relationship" can be established with technology which does not require either a rejection of technology in the way of luddism or a blind acceptance of all that is technological (Heidegger, QCT, 287). Technology is not something to be controlled. Technology is a way of thinking and acting out of Being, a way in which Being reveals itself to us as a particular kind of being. The technology that is a danger is characterized by a narrowly utilitarian, calculative, instrumental thinking. Of course, this way of thinking reveals to us not only the device as a useful tool, but also the kind of being we are who is capable of seeing it as a device, and the kind of society structured around this way of seeing. It is this all-encompassing cultural paradigm, which Heidegger calls the *enframing*, that makes it so difficult to understand the historical and metaphysical nature of technology. Still, as this particular form of thinking, this paradigm, is a particular historical mode of being that has come to be, it can also cease to be, and be replaced by other paradigms.

The awareness of the historical nature of technology is a freedom towards the possibility of other cultural paradigms in which technology takes on a different meaning. Heidegger considers the transition to a new and different technological paradigm in what he calls the "Turning." The Turning is a transfiguration of technology in which nature is not viewed as exclusively instrumental, and efficiency is not the dominant value. Heidegger speaks of the transfiguration to a new technological paradigm as occurring suddenly in a flash and literally happening before we know it and are able to articulate it. It is like a lightening stroke, and Heidegger speaks of it as a "flashing glance" (Heidegger, QCT, 45) into a new and radically different worldview. With what attitude should we dispose ourselves toward this coming event that is the Turning? Heidegger

says that the lightening flash comes out of stillness: "Will we see the lightning-flash of Being in the essence of technology? The flash that comes out of stillness, as stillness itself?" (QCT, 49)

The stillness stills the thought and action that would merely repeat the same Gestalt from which the Turning turns away. This stillness is also that attitude of questioning which Heidegger says is the piety of thought (QCT, 35). It is still because it does not give itself over to the conventional modes of thought which its age considers as constituting the methods of the positive sciences. Heidegger says,

> All mere chasing after the future so as to work out a picture of it through calculation in order to extend what is present and half-thought into what, now veiled, is yet to come, itself still moves within the prevailing attitude belonging to technological, calculating representation. (QCT, 48)

Pious thought, or what Heidegger also calls "meditative thinking," in comparison to calculative reasoning, is thought that understands itself to arise out of an unseen ground which can never be an object of discursive thinking. For Heidegger, truth is not a matter of a correspondence between the word and the object. Because of the hermeneutic circle, where the factual is a function of thought, the grounding of thought must occur elsewhere than in fact. This ground is that out of which the vision of the totality of things arises. This is what Heidegger means by metaphysics, which he says, "grounds an age in that through a specific interpretation of what is …it gives to that age the basis upon which it is essentially grounded (QCT, 115).

With such an understanding we look at Taoism's characterization of technology with the expectation of perhaps finding a vision of the world that is an alternative to Western technology, not necessarily one to which Western technology can turn, but one with which it can be contrasted and compared, particularly with respect to the nature and role of efficiency. The attitude of Taoism neither resists nor obsesses over efficiency. It is, to use Heidegger peculiar expression, a "releasement towards things" (1966, 54). Heidegger says that

> We let technical devices enter our daily life, and at the same time leave them outside… as things which are nothing absolute but remain dependent upon something higher. I would call this comportment toward technology which expresses "yes" and at the same time "no," by an old word, *releasement towards things*.

This "something higher" is referring to our relationship to Being which takes the form of the metaphysics of the age. Heidegger's Turning is one more affirmation of Heidegger's view that technology is metaphysics. The Turning, therefore, is not only a new technological paradigm, but also a different relationship to Being, that is, to an interpretation of what-is.

Not only are we not able to think our way to a new technological paradigm, but for Heidegger there is nothing that we can do, no positive action that we can perform that could bring us to it. Heidegger says that,

technology will never allow itself to be mastered, either positively or negatively, by a human doing founded merely on itself. Technology, whose essence is Being itself, will never allow itself to be overcome by men. That would mean, after all, that man was the master of Being. (QCT, 38)

To say that technology is the essence of Being itself is to say that technology is a metaphysics and as such is not something which man stands outside of that can be manipulated and known. It is rather that out of which and through which man experiences the world. It is always presupposed by thought and action. The first and well-known line of the *Tao Te Ching* that, "the Tao that can be told of is not the eternal Tao" (Chan, 139), is a succinct statement of Heidegger's view of the relationship between language and Being, and his critique of metaphysics. The mistake of Western metaphysics is in failing to recognize the distinction between the ontic and the ontological by treating Being as a thing, such as Idea, as substance, as God, as matter, etc., that is, treating it as an object of discourse. As far as the relationship between language and the world, the *Tao Te Ching* claims that "the named is the mother of all things" (Chan, 139). For Heidegger, Being comes to presence in language. Language is the house of Being. These two claims, first, about the relation of language to Being and, second, the relation of language to the world, bring Taoism and the philosophy of Heidegger into close conceptual proximity. Heidegger's views of language and metaphysics, but also his view of an authentic relationship to human instrumental artifacts involves both a simultaneous relation to Being and to beings. To see the tool as mere instrumental fact, exclusively in its usefulness, and not as an "interpretation of what is" is precisely the condition of the relationship between the human and the technological that Taoism rejects.

A Case of Rejecting Efficiency

The ancient Taoist texts, the *Chuang Tzu* and the *Tao Te Ching*, are among other things, manuals of action, and to that extent, treatises on technique. Efficiency is a property of action. What is learned from the ancient Taoists text is that, not only must action be efficient, but it must also be effective, entrepreneurial, and innovative and as such must be thought of as part of a larger system of values that in the thought of Heidegger is called the "single manifold." From the perspective of Taoism, Western technology has a restricted concept of efficiency because it does not include the other properties of effective action. Action that is innovative and entrepreneurial redefines the distinction between what is useful and useless, and in doing so turns what was considered valueless into something valuable. This capacity to transvaluate things is a form of power that stands in contrast to a restrictive concept of power that is usually associated with machine technology. These properties of an enlarged concept of efficiency are illustrated in the *Chuang Tzu* and the *Tao Te Ching*.

There is a story in the writings of Chuang Tzu of a farmer who is irrigating his vegetable garden by carrying jars of water from a well, working very hard and getting very little results (1968, 134). A disciple of Confucius, Tzu-kung, remarks to the man that there is a machine that can make the work of watering the garden go much faster with little or no effort. The gardener is at first curious about the device, but hearing of its design, complains that such a machine would give him "machine worries" and "machine thoughts." Presumably, machine thought is instrumental thinking about means and ends, and machine worry is the concern arising out of an increasing dependency upon such mechanisms. Even though the machine would save time and effort, and get more accomplished, the gardener claims that simplicity would be ruined and the

mind would become unsettled. The gardener makes a kind of cost/benefit analysis. He judges that there would be more lost than gained in using the machine.

Of course, weighing costs and benefits is part of instrumental thinking; however, there is a state of mind which the gardener is claiming that is incompatible with instrumental reasoning and which is more central to human nature. It is worth noting that the gardener does not reject the idea of a labor saving device from the outset. He first enquires how it works. It is explained that it is made of wood, heavy on one end and light on the other. It raises water so quickly that the water seems to boil out of the device. The gardener at first is angry upon hearing this and his criticism is not that of an engineer, but of a metaphysician who claims that instrumental thinking causes the mind to lose touch with its true nature. However, one wonders, since the gardener at first inquired about the design of the device, whether or not a different sort of machine would have satisfied him. Would the gardener reject the plow and shovel for turning the soil by hand, or riding in a carriage for walking by foot? Although the text is not clear about what the criteria are for accepting or rejecting a particular technology, some criterion is applied.

The story of the gardener does not end with the gardener's criticism of the machine. Tzu-Kung felt ashamed after hearing the critique by the gardener and felt stunned when the gardener further made criticism of his teacher Confucius. Tzu-kung says that what he learned from Confucius was that the way of wisdom was to "spend little effort and achieve big results," which is a succinct definition of efficiency. However, Tzu-Kung recognizes in the gardener someone for whom "achievement, profit, machines, [and] skill" (1968, 135) have no value. Fame and the praise and condemnation of the world have no meaning to him. Tzu-kung describes him as someone who "never knows where he is going." The gardener seems to be the embodiment of the non-technological mind that is devoid of reasoning about antecedent and consequent, means and ends. Tzu-kung reports all of his impressions to Confucius.

Confucius's response is that the gardener is a fake. Confucius says that the gardener attends to what is inside to the exclusion of what is on the outside. For Confucius, one who attends to both is able to enter the everyday world in which machines have their place, while at the same time remaining in simplicity. Confucius calls the gardener a bogus practitioner of the arts of Mr. Chaos who is described elsewhere in the *Chuang Tzu* as not having the seven openings of ordinary men that allow them to "see, hear, eat, and breathe" (1964, 97). The seven openings are the senses that bring human consciousness into contact with the world. The art of Mr. Chaos is to live in the world without instrumental thinking, without the thought of means and ends. Mr. Chaos does not think about the future and that is why Tzu-kung says of the gardener that he never knows where he is going, just like the flow of water, which is the central symbol in Taoism for how to live life. However, the criticism of Confucius indicates that the world must be engaged as well, meaning that instruments and instrumental thinking have their place, but their place must not usurp another kind of consciousness that is without means-end thinking and whose awareness of time is wholly in the present.

Not having the seven openings refers to the state of no-mind (*wu-nein*), which is the meditational state in Asian traditions that contrasts with the temporal mind that plans and calculates. Confucius claims that what is truly astonishing is the person who is able to combine both the state of no-mind with a mindfulness whose main attention is efficiency in action. Unlike the gardener who rejected a machine that would make his efforts easier and more productive, Confucius describes someone who is able to attend to both the external and the internal, and who is able to employ the machine without losing simplicity and without having machine worries and machine thoughts. Confucius is praising the ability to balance instrumental thinking with a consciousness that is

entirely devoid of thought of means and ends. The gardener had achieved the one but not the other. Such a meditational state of mind was what made Cook Ting's action efficient. He says in explanation of his skill, that "perception and understanding have come to a stop" (1964, 46-47) which allows him to go along with the natural makeup of things and pass his knife through the hollows and openings without encountering resistance.

Other instances of efficient action that balance the internal and external are found throughout the *Chuang Tzu*. There is the hunchback who catches cicadas with a sticky pole, "as easily as catching them with his hand." Confucius exclaims, "What skill you have…" and asks, "Is there a special way to do this?" The hunchback explains that no matter how numerous things are, he sees only cicada wings and nothing else. Confucius remarks on his state of mind that, "He keeps his will undivided and concentrates his spirit [i.e., his mind]" (1964, 120). There is another instance of a ferryman handling his boat with great skill. Again, Confucius asks how he does this. The ferryman explains that that he lost all fear of the water. He sees water as so much dry land and regards the capsizing of the boat as the overturning of a cart. If the whole world were to be turned upside down, it would not affect him (1964, 122). Here again efficient and skillful action arises from a state of mind that is still and free of calculative thinking. In an archery contest, when the stakes are small "you shoot with skill," but when the stakes are high you become a nervous wreck. The skill is the same in both cases but the mind is inefficient when it is no longer quiet.

Insight is found into this non-instrumental consciousness from the story of the disciple Hui who tells Confucius that he is setting out to reform a young and reckless ruler who is destroying his kingdom. After Confucius hears the strategies that Hui intends to use, Confucius tells him that he will only get his head cut off. Instead Confucius tells him to fast, which Hui interprets at first as a suggestion to fast the body. Confucius explains that it is not the body, but the mind that must fast. Confucius tells Hui that action taken from the standpoint of an empty mind is like walking without touching the ground and flying without wings, both of which are metaphors for effortless action. There is the also character of Meng-sun of whom Confucius says that he,

> does not know why he lives and does not know why he dies. He does not know why he should go ahead and does not know why he should fall behind. In the process of change he has become a thing [among other things], and he is merely waiting for some other change that it does not know about. (1964, 84)

Evidently the mind that is empty is without thoughts of present and past, means and ends. However, this is only one side of the formula for properly managing life. The other side is attending to external things and living life in the most efficient manner.

This state of mind, empty of instrumental utilitarian thinking, is a form of consciousness that is immanent and non-positional. Georges Bataille referred to is as "*non-savoir*," that is, unknowing, and thought of it as a form of intimacy in which things lose their object status, where subjects no longer stand in opposition to a world of objects, and consciousness exists in the world "like water in water" (Bataille, 23). Interestingly, for Bataille, this immanent consciousness was lost because of an original positing of the first tool as a "middle term" between subject and world (Bataille, 27). At that point, the world was divided into means and ends, present and future, and the pure enjoyment of ends for their own sake was endlessly postponed. Time lost its momentary brilliance and enfolded into a sequence of operations, instrumentally conceived. The origin of technology marks the loss of intimacy and of immanent consciousness, for Bataille. The Taoist conception of *wu-nien* (no-mind), on the other hand, is not inimical to technology; in fact, this no-

mind, which is intimacy and immanent consciousness, is compatible with and necessary for a technological engagement with the world that is efficient and effective.

Redefining Ends: The Use of the Useless

Instrumental thinking that is not balanced by a non-instrumental state of mind is not innovative, entrepreneurial, or effective. Instrumental thinking by itself is rigid and linear and forces things to conform to its own program of action. There is a story of the logician Hui Tzu who has been given enormous gourds, but complains to Chuang Tzu that he could not use them for containers because they were too heavy to carry (1964, 28). He says that they were useless as dippers because there was nothing large enough to dip them into. He decided that they were of no use and destroyed them. Chuang Tzu asks why he did not think of using them as boats to float around on the rivers and lakes and tells a story about a salve that allowed a poor family to make a meager living bleaching silk. The same salve was bought by an entrepreneur who made a fortune selling it to a king, who, in turn, used it to win a naval battle. What produced a meager living in one case made a fortune and saved a kingdom in another. The first kind of instrumental thinking was limited to one form of usefulness whereas the other kind of instrumental thinking was open to redefining what was useful and seeing usefulness in what otherwise would be regarded as useless. The transvaluation of things, borrowing a term from the philosophy of Nietzsche, is part of efficient instrumental thinking. What produces fortune is precisely creating value where there was little or none before.

Instrumental thinking that sees every thing in terms of usefulness is the kind of thinking that Heidegger criticizes in stating that technological thinking in the modern age sees all things as resource. Things are seen through the lens of how they can be used. The mountains are stone to be quarried, the forest is lumber to be sawn and milled, and the river and wind are sources of electric power. However, Chuang Tzu says that "A man must understand the useless before you can talk to him about the useful" (1964, 136). When we stand, we use only the small portion of earth beneath our feet. However, if the earth on which we do not stand, were to be removed, the part on which we do stand, would no longer be useful. To see everything as exclusively useful is to ignore the dependency of the useful on the useless and to fail to see how calculative thinking is only effective against the backdrop of a state of mind that is entirely free of calculation. It is out of that state of mind that new values arise. The *Chuang Tzu* speaks of a huge knurled tree, which carpenters ignore because its trunk is too bumpy to cut, and its branches too curved to make lintels and sills. It is useless from the ordinary point of view, but Chuang Tzu observes that since no one will ever put saw or axe to it, it will have a long life. He suggests lying beneath its shade and doing nothing. He speaks of planting it "in the Not-Even-Anything-Village, or the field of the broad and borderless," metaphors which invoke images of non-instrumental states of mind (1964, 35) before things have been differentiated and distinctions made. The field is without borders, because it is by means of borders that the thought of things arise. It is that state of mind that instrumental thinking must step back into in order to experience a redefining of its goals and a revaluation of its means. Like the big useless tree, there is also Crippled Shu who waives goodbye when the troops are called out and who is looked over when work parties are formed. Shu's handicap is a misfortune from one point of view, but a fortune from another (1964, 62). Here again a transvaluation of ends accompanies thinking about the means for achieving those ends. The capacity to reevaluate ends is necessary for instrumental thinking if it is to be more that merely efficient.

The openness to redefine ends, and thereby reinterpreting the useful and useless, is the kind of thinking that the logician Hui Tzu lacked. His logic presumably consisted in the best way of

achieving certain ends, but did not include an openness to redefine ends, which would have turned the huge gourds into something useful. This is one aspect of the criticism that the gardener made in speaking of machine thinking and a machine heart. Machine thinking is an instrumental thinking that considers only the means for achieving certain ends without contemplating the possibilities of alternative ends. Truly efficient thinking is an attention to not only the means but to ends as well, that is, it combines efficiency with effectiveness and is able to see usefulness and value in what at first appeared useless and valueless. This ability is due to the flexible, dynamic nature of the Tao, which effortlessly responds to the specific characteristics of a situation (1964, 35). Chuang Tzu calls this prerequisite state of mind "being without bent" which is clearly openness to transvaluating means and ends (1964, 103).

Action and Non-Action

Action that is flexible to both means and ends is *wu-wei*, literally non-action. It refers to a type of activity that engages in action without violating the nature of the object that is acted upon or the nature of the instrumental context in which the action takes place. An understanding of this insight can be gained by simply contemplating the distinct functions of a spoon, fork and knife. The knife is used for cutting, the fork and spoon are used for moving and raising solids and liquids. The spoon and knife can be used for cutting, but that is not their natural function. In this sense, *wu-wei* is concerned with the appropriate or inappropriate use of a tool. A tool that is appropriate arises in the world effortlessly and efficiently. Furthermore, beside the instrumental context, there is a larger human context in which the tool must fit. This fittingness is first and foremost an aesthetic matter that concerns sensibility. An insensibility to the larger context that includes aesthetic, epistemological, and religious values makes the introduction of the tool, intruding and unnatural. Technological devices born out of an exclusive focus on efficiency impose themselves on the world, while technologies that fit in the larger context of human existence grow out of it. Action that is technological in the sense of *wu-wei*, then, is natural and necessary.

The concept of Te in the *Tao Te Ching* has both moral and non-moral implications. It has been translated both as 'power' and as 'virtue'. A thing, such as a pencil, has its own Te, an intrinsic power to be what it is and to do what it does best. For example, there are surfaces which a pencil marks better than any other tool for writing, Everything, including artificial objects, have a Te. A spoon has its own natural way of being in the sense that it fits precisely the context in which it is used. (Fung Yu-lan, 101). The Te, therefore, is the power that allows for effective action. The Te of the spoon is not in the spoon apart from its user; it is not intrinsic to the spoon left unused on the table. It manifests itself only in the spoon while-in-use, and only if the spoon-in-use does not violate the integrity and simplicity of the single manifold.

> According to the theory of having-no-activity, a man should restrict his activities to what is necessary and what is natural. 'Necessary' means necessary to the achievement of a certain purpose, and never over-doing. 'Natural' means following one's Te with no arbitrary effort. In doing this one should take simplicity as the guiding principle of life. (Fung Yu-lan, 101)

If the spoon is too heavy, then it does not fit in the natural order established by the context of eating a meal. If the spoon is too ugly (or too beautiful), it imposes itself on the attention of its users. The principle of the mean is operative here. The spoon should neither be too long nor too short, neither too pointed nor too rounded, neither too cupped nor too flat. Here virtue, Te, is the mean between excess and defect. The considerations that determine what is appropriate are

virtually endless and engage not only the sensibilities of the engineer, but also those of the artist and the metaphysician.

Te has moral implications. A world moved by *wu-wei* is not beyond good and evil, but it is beyond fixed characterizations of what good and evil are. There would be no need to distinguish between good action and evil action, between good and bad machines, because actions and devices would arise naturally and organically. This fitting-into the natural order means fitting-in the single manifold of the good, the true, the useful, and the holy that is humanity, since the proper sphere for technology is given by the relationship between the user and the tool. In this sense, some technologies would be naturally acceptable, while some would be rejected. Taoist ethics is to be found at the level of aesthetic sensibility, not of moral or political understanding. Sensibility is set in motion by the type of relationship established between the human and the machine and the larger context of instrumental relationships.

A good spoon, one that is virtuous, that has Te, is not too heavy and it is not too light; the metal is neither too thick nor thin. It is polished to the degree that food does not easily stick to it. It is balanced so that it can be held easily. All of these properties are part of efficiency. The spoon could be used as a weapon to injure someone, and we may judge that to be unethical, but that limitation does not need to be imposed on the spoon from the outside by ethical standards. The spoon does not make a very efficient weapon, particularly if your opponent has a sword. Its inefficiency limits it from being used unethically. The spoon is also part of an instrumental complex, that is, a system of instrumental relationships. So the shape of the spoon should conform to the shapes of the cups and bowls with which it is used. This fitting into to the instrumental complex is part of its efficiency. In all of these cases we are talking about what makes a "good" spoon. Good in the sense of efficiency flows into good in an ethical sense. Technologies that pollute the air and water that we and other living things breathe and drink are, in the context of a consideration of ends, inefficient and ineffective, but they are also morally wrong in a broader sense than the standards of a merely human ethic.

This virtue or power of Te results in an effortless form of action that does not require deliberation about means and ends. It is efficient action but action without instrumental thinking. Flowing water is used in the Taoist literature as an analogy for the path of the Tao informed by such non-instrumental thinking. Flowing water takes the shape of its container. It is without will or plan or any form of its own. It either flows around or over obstacles, or over time wears them away. Sometimes it rises up as a powerful force; at other times it is yielding and weak. The *Tao Te Ching* evokes the effortless effectiveness of water in these few lines: "There is nothing softer and weaker than water, and yet there is nothing better for attacking hard and strong things…. All the world knows that the weak overcomes the strong and the soft overcomes the hard, but none can practice it" (Chan, 174-175). The difficulty of putting effortless action into practice is the result of the tendency to yield to linear instrumental thinking that is not open to redefining means and ends and which encounters the world with opposition and resistance. Presumably this is what the gardener saw in the machine that he refused to use.

Theories of Embodiment

Another way of understanding the gardener's rejection of the tool is to say that the machine was not a device with which the gardener could enter into an intimate relation. By 'intimate' is here meant a relationship of embodiment between the user and the tool. This intimacy occurs most notably in sports with instruments like baseball bats, golf clubs, tennis rackets where the player experiences the instrument as an extension the body. The use of the tool in the case of

embodiment is spontaneous, and non-deliberative, without reflection dividing the action into the subject as user and the tool as object. There are strong similarities between this Taoist theory of effective action and theories of tool embodiment proposed by Don Ihde and Hubert Dreyfus. In describing the process of skill acquisition, Dreyfus distinguishes stages that the use of a tool must pass through in order to achieve the maximum efficiency. Initially, the encounter with a new tool requires a step-by-step learning process that divides the action into small acts, where each act is translated into a rule that can be memorized and applied. At this stage, the use of a technological device is very slow and tentative and reaching the goal is subordinate to the learning process. Here rules are applied deliberately and rationally. The stage of expertise, however, is one in which the user is no longer limited by rules and rational deliberation. Action becomes fluid and reactive, stemming from an "immediate intuitive situational response" (Dreyfus and Dreyfus, 109). Effective action at the stage of expertise needs no deliberation, and intentionality becomes an intrinsic element of the sensible engagement with the world. In embodiment, the use of the tool or machine reaches a level of competence that eliminates all mediation between the tool and the user.

A further level of action can be identified beyond the level of expertise that most closely resembles the Taoist concept of *wu-wei*. Quoting Aron Gurwitsch, Dreyfus makes a clear Taoist observation: "we do more and greater justice to [the situation] the more we let ourselves be guided by it, i.e., the less reserved we are in immersing ourselves in it and subordinating ourselves in it" (Dreyfus and Dreyfus, 111). Dreyfus calls this "purposive action without a purpose" (Dreyfus and Dreyfus, 112). Using the example of a tennis player, Dreyfus notices that, while she is playing at the expert level, the court, the ball, the racket and all other elements of the situation, form a complete gestalt where there are no distinct parts at the moment when the ball is hit. The goal of action is already in the situational engagement; it is not imposed on it through planning and deliberation.

Merleau-Ponty defines embodiment as a process that unifies the innate structure of the body with its abilities to grasp, walk, talk, and so on, the skills solicited by the kind of world the body inhabits (a world that requires grasping, walking, talking and so on), and finally the cultural situation that makes these potential skills relevant to life. "By embodiment," Dreyfus observes, "Merleau-Ponty intends to include all three ways the body opens up a world" (Dreyfus and Dreyfus, 104). The unity of these three aspects of embodiment is what Merleau-Ponty calls "the intentional arc." The three aspects which constitute the intentional arc are (1) the innate structure of the body, (2) the physical world which the body inhabits, and (3) the cultural situation that makes actions meaningful. Engagement in the world must follow such an arc to achieve its goals, but in order to achieve them it has to project itself in a way that fits within a human personality conditioned by its pre-established position in the world. "The life of consciousness—cognitive life, the life of desire or perceptual life—is subtended by an 'intentional arc' which projects round about us our past, our future, our human setting, our physical, ideological and moral situation" (Merleau-Ponty, 157). Therefore, intentional engagement with the world includes moral, ideological and, it must be added, aesthetic considerations in order to achieve what Merleau-Ponty calls "maximum grip," that is, the sense that the subject is in the best possible position to engage the situation efficiently and effectively. With such an immersion in the world, the situation shapes action without the need to set a deliberate goal. This is full embodiment. It is illustrated by the actions of Cook Ting in cutting up the ox and in the hunchback catching of cicadas with the sticky pole. Embodiment is the criterion that the gardener used in rejecting the use of the machine for raising water.

It can be seen, therefore, that a theory of embodiment that focuses only on the conditions of efficiency in a narrow sense, that is, the skillful use of a tool, without including the context of the situation at large, would not be sufficient, to explain effectiveness. The Taoist theory has the merit of making manifest the implications of true embodiment for a theory of values in technology. Heidegger's manifold is reintegrated only as a result of broadening the understanding of efficiency to include aesthetic and ethical values. The most effective use of a tool is one that does not violate a sensibility of what the situation requires in a broadest sense, which includes both ontic and ontological concerns.

The Hinge of the Way

Technology in the broader sense, which is sensible to a larger manifold of values, finds power not only in efficiency, but also in the capacity to transvaluate instrumental complexes. The *Chuang Tzu* says that everything has its this and everything has its that. The terms 'this' and 'that' refer to opposing values. So keeping promises in one case is good and in another case bad. Symmetry in one instance is beautiful and in another instance ugly. Sometimes loyalty and trust are sacred, sometimes they are not. Something is useful in one context, but useless and a burden in another. The Way, it is said in the *Chuang Tzu*, has no boundaries that is, no thing can be defined as being such and such absolutely. Those who follow the Way cannot be said to have, or not have, a fixed this or that. The state in which there is no longer a this and that is called the "hinge of the Way" (1964, 35). The image of a hinge is used because a hinge easily swings back and forth between opposing positions. When the hinge is fitted into a socket, that is, when the state of mind that is without a this and a that is placed in a situation of action, it is said that it is able to "respond endlessly." It is then that the *Chuang Tzu* says "Great Benevolence is not benevolent, Great Modesty is not humble, and Great Daring does not attack" (1964, 39). That Great Benevolence is not benevolent means that it cannot be defined in any unqualified and unconditional sense that is the same under all conditions. Generosity cannot be defined as giving five dollars or giving five hundred. It resists being bounded by a formula. Great generosity sometimes gives everything and sometimes it gives nothing.

Responding endlessly is a quality of truly efficient action, namely, resourcefulness, which is possible provided that moral, aesthetic, epistemic, and religious values, which are the qualities of correct action, are not fixed and rigid. The form that action takes arises out of the efficiency of action, like water taking the path of least resistance, rather than having its form imposed upon it by a rule based system of definitions. Repeatedly throughout the early Taoist literature, truly virtuous action is without deliberation and premeditation, that is, without exclusively instrumental thinking. The ends of action as well as the means are determined incrementally *in vivo*.

Conclusion

Instrumental thinking which is necessary at different stages in the course of action is subordinate to a different order of thinking. In Taoism this is called *wu-nein* and it is not unlike the meditational thinking that Heidegger refers to in the Turning as the stillness of thought and action. It is out of the stillness that instrumental complexes change their value and new systems of instrumental values arise. In the language of the *Chuang Tzu*, this becomes that and that becomes this. The complaint that Heidegger directs toward Western technology, that it neither recognizes itself as a metaphysics, nor is informed by metaphysics, is an awareness that can be found in Taoism's own understanding of efficient action.

Truly efficient action in Taoism is open to transvaluating the values out of which it acts and setting itself on a new course in response to what the situation requires. This is why there is the repeated injunction in the *Tao Te Ching* to leave it be, let it alone, allow things to rest, to do nothing, since whether action is required or not is relative to a system of values. This capacity to transvaluate is the essence of innovation and resourcefulness, and is the meaning of *wu-wei* (non-action), which is effortless and acts without meeting resistance. *Wu-wei* requires *wu-nein* (no-mind), which steps out of instrumental thinking into a source of a broader system of values that cannot be made the object of discursive knowledge. The paper has noted the resemblance of Taoism's understanding of efficient action to Heidegger's critique of Western technology. Heidegger sees stillness as a propaedeutic towards an alternative technological paradigm in the essay *The Turning*. Stillness, includes an awareness of the distinction between what can be said and thought, and that out of which speaking and thinking arise, which cannot be spoken or thought, that is, to the distinction between the ontic and the ontological.

The critiques that Ellul and Heidegger make of technology presuppose a narrow notion of efficiency. However, the philosophy of action that is found in the *Chuang Tzu* and the *Tao Te Ching* add to the concept of action facets of action that are effective, entrepreneurial, innovative and resourceful, and place efficiency integrally within a manifold of values that are ethical, aesthetic, and religious. Ancient Taoism sees action and understands the useful as resting within and against a horizon of what is beyond instrumental value, and locates instrumental thinking within a state of mind that is entirely free of instrumental thought. In the language of Taoism, such action is in accord with the Tao and moves within the natural contours of the situation in which the action takes place. It does not require control from without in order to posses the values that Heidegger saw as part of the single manifold. It is a concept of efficiency that is autonomous and self-limiting and that does not require subordination to a rule based ethic, but is in fact capable of generating ethical standards.

References

Bataille, G. 1992. **Theory of Religion.** New York: Zone Books.

Chan, W., Trans. 1963. **A Source Book in Chinese Philosophy**. Princeton: Princeton University Press.

Chuang Tzu. 1964. **Basic Writings**. Burton Watson (Trans.). New York: Columbia University Press.

Chuang Tzu. 1968. **The Complete Works of Chuang Tzu**. Burton Watson (Trans.). New York: Columbia University Press.

Dreyfus, H., and S. Dreyfus. 1999. "The Challenge of Merleau-Ponty's Phenomenology of Embodiment for Cognitive Science." In **Perspectives on Embodiment**. G. Weiss and H. F. Haber (Eds.). New York: Routledge.

Ellul, J. 1964. **The Technological Society**. New York: Alfred A. Knopf.

Fung Yu-lan. 1948. **A Short History of Chinese Philosophy**. D. Bodde (Ed.). New York: The Free Press.

Heidegger, M. 1966. **Discourse on Thinking**. New York: Harper and Row.

Heidegger, M. 1977. **Basic Writings** (referred to as BW). New York: Harper & Row, Publishers.

Heidegger, M. 1977. **The Question Concerning Technology and Other Essays** (referred to as QCT). New York: Harper and Row.

Lienhard, J. 2000. **The Engines of Our Ingenuity**. New York: Oxford University Press.

Lyotard, J. 1993. **The Postmodern Condition: A Report on Knowledge**. Minneapolis: University of Minnesota Press.

Merleau-Ponty, M. 1958. **Phenomenology of Perception**. C. Smith (Trans.). New York: Routledge.

Mitcham, C., and R. Mackey, Eds. 1972. **Philosophy and Technology: Readings in the Philosophical Problems of Technology**. New York: the Free Press.

Winner, L. 1977. **Autonomous Technology**. Cambridge: The MIT Press.

Material Agency:
A Theoretical Framework for Ascribing Agency to Material Culture

Michael David Kirchhoff.
Research unit on Material Culture, Cognition and Nature,
University of Aarhus, Denmark

Abstract

This article attempts to articulate a theoretical framework, the target of which is to systematically unearth the conditions validating the ascription of agency to material culture. A wide range of studies, located within the interdisciplinary field known as material culture studies, testify to and aim at (re)uniting the materials of material culture with the notion of agency. In this article the argument is advanced that material entities have agency *only if* two necessary conditions are met: an ontological condition (agency is an *a*symmetrical *and* relational category) and an epistemological condition (material entities mediate and transform human understanding). Hopefully, this way of approaching matters will help to establish a constructive framework for future debates.

Keywords: agency; material culture; relational and asymmetrical ontology; material hermeneutics; affordances.

1. Introduction

The research goal of material culture studies is simple and straightforward: To investigate the relationship between people and things irrespective of space and time. This is a broad definition, allowing for serious inquiry on the intersection (and interdependence) of human beings and material culture.[1] Within the last ten to fifteen years, one aim in these studies has been to understand how landscapes, technologies, artifacts, things, etc., *actively* shape, impact and transform the perception – and consequently understanding – human beings have of the world in which they dwell. It is the aim of including the notion of *agency*, otherwise traditionally understood to denote an epistemic capacity of human subjects, to material-cultural phenomena. This view may be articulated accordingly:

> (*P*) Material entities have, ontologically and epistemologically, the quality of *agency*.

1.1. Two versions of material agency

The claim embedded in (*P*), we might call *The Material Agency Thesis*. There exist two versions of this thesis in the contemporary landscape: what I will call the *strong view* of material agency and the *weak view* of material agency. Viewed from above the two versions are quite similar. Both versions take as their point of departure the *organism-in-its-environment*, as opposed to (1) idealism, the view of a self-contained subject confronting an "outside world", and the *environment-surrounding-its-organism*, and (2) realism, the view of an existing world in-itself independent of any subject inhabiting it. Equally, the reason *par excellence* of attributing agency to material culture is shared by both versions: whenever the newly additional causal factors – kinds of technologies, for instance – reveal themselves to be *at the root of some distinctive target feature* of the phenomenon in question. Because of this, and engrained in both versions, is the

view that things do far more than simply effect what human agents do; things transform and impact the specific way in which reality discloses itself for human beings.

Despite these (important) similarities, however, when viewed from below the two versions are quite distinct and potentially in some degree of tension. Versions of the *strong view* can be found, for instance, in actor-network theory (Latour, 1993, 1999), and in post-processual archaeology (Olsen, 2003). Here the notion of material agency is based on an "argument by parity": If (X) – a technology – and (Y) – a human subject – are so coordinated that they *together* constitute, e.g., some behavioral activity (A), *then* there is *no principled difference* between (X) and (Y) in their contribution to (A). On the strong view, then, the notion of material agency may be understood to express the following claim: *If* it is equally credible to assign the same *functional* role to (X), as we normally or intuitively do to (Y), *then* (X) is part and parcel of the process constituting (A). This expresses Latour's amodern, symmetrical ontology – the roles that humans and nonhumans play in networks are *functionally equivalent* (Latour, 1999: 178-80).

Support for the *weak view* is evident, for example, in some postphenomenological approaches to technology (Ihde, 1991; Verbeek, 2002, 2005), in the work of ecological psychologists (e.g., Gibson, 1979; Kadar & Effken, 1994), in classical phenomenology (Heidegger, 1927), and in anthropology (Gell 1998; Ingold, 1996, 2000, 2005, 2006, 2007ab). I do not propose to claim that the positions, classified as holding the weak view, are similar across the board; they are not. However, they are importantly different from the strong view! Strictly speaking, on the weak view the notion of material agency is rooted in what we can call the "coupling as constitution argument": *If* (X) and (Y) are so coordinated that they together constitute (A), *then* (X) and (Y) make up a causally coupled system. Because of this, neglecting to take (X) into account when explaining (A) is equivalent to not recognizing (X) as importantly transforming the nature and/or generation of (A), whenever coupled with (Y).

Within the scope of the weak version lies a view substantially different from the one advocated in the strong version: In contrast to the strong view, in which material agency turns on a position of *no principled difference* between (X) and (Y), the weak view takes into account the specific details of human embodiment; that the lived body of human beings makes a *special* and *ineliminable* contribution to the agentive dimension of material-cultural entities.

1.2. General account of conditions for attributing agency to material culture

The Material Agency Thesis constitutes, I believe, an important and challenging development in contemporary philosophy of technology and material culture studies. But it is a development whose genuine value is easily obscured by terminological misunderstandings (the term "material agency" being an especially slippery case) and pre-philosophical reactions (its just animism, or, on the other side, fetishism). The goal of the present paper is to set up, although tentatively only, a theoretical framework: partly to contribute to a constructive future debate; and partly to systematically unearth the conditions warranting a persuasive ascription of agency to material culture. Now, there are numerous ways in which one can embark upon such an endeavour, one seemingly as arbitrary as the next. However, in order to lay out the general structure of discussion, we may gain some headway by using as a heuristic this formally derived argument from Olsen (2003: 88): $((P \rightarrow R) \wedge (P \rightarrow Q) \models P \rightarrow (R \wedge Q))$:[2]

1. (P) Material entities have, ontologically and epistemologically, the quality of *agency*. *Only if*,

2.   (*R*) All material entities are *beings* in the world alongside other beings, such as humans, plants, and animals. *And*,

3.   (*P*) Material entities have, ontologically and epistemologically, the quality of *agency*. *Only if*,

4.   (*Q*) All material entities have *de facto* existing qualities that affect and shape the way human beings perceive and understand the world. *Therefore*:

5.   (*P*) only if (*R*) and (*Q*).[3]

In this argument, I suggest that (*R*) and (*Q*) are each logically necessary conditions for the validity of (*P*), and that each premise has different implications for the understanding of (*P*): (*R*) has the function of a necessary *ontological* condition and (*Q*) the function of a necessary *epistemological* condition. As it happens, I think they are sufficient too: They are *separately* necessary and *jointly* sufficient conditions for (*P*). Generally speaking, (*R*), the claim that all material entities are *beings* in the world alongside other beings, such as humans, plants, and animals, is certainly necessary for the thesis of material agency, because it is the overcoming of the radical dichotomy between subject and object that constitute the ontological base for addressing the issue of material agency in the first place. Nevertheless, (*R*) is not sufficient for warranting the thesis of material agency – neither in its strong nor in its weak version. This is the reason why (*Q*), the claim that all material entities have *de facto* existing qualities that affect and shape the way human beings perceive and understand the world, is also necessary. (*Q*) takes the claim couched in (*R*) an important step further. It entails that our material lifeworld impacts and shapes the way in which our lived reality discloses itself. Now that we've achieved some initial clarity about what I take to be the fundamental issues concerning the intelligibility of (*P*), let's take a further step towards conceptual clarity by addressing the specific contents embedded within (*R*) and (*Q*). I will deal with each premise in turn.

1.3. Conditions explained

As a *modus operandi* it is always insightful to depart by way of concrete examples. Consider the example of a blind man finding his way by means of his cane. It is an example put to use by Ihde (1990: 40).[4] In the blind man's ongoing, here-and-how, use of cane, the cane, we are informed, discloses an existen*tial* ontological relationship between subject and object – every human being is *always already* invariably situated alongside other material-cultural entities.[5] Note that this is an already-given ontological situation; a situation where material culture must be conceived as co-constitutive of human action, thought and understanding (Verbeek, 2005: 112). Consequently we may state that (*R*) expresses a commitment in which (*P*) is justifiable only if (*P*) is tantamount with an "*ecological and relational ontology*". That is to say, an ontology where nature (object, matter) and culture (subject, social) is viewed in non-dualistic terms, and where material agency turns partly on the embodied nature of human beings and partly on the properties of materials of material culture (for related views see Gibson, 1979; Ingold, 2007a; Wheeler, 1996, 2005). Note that these criteria are in accordance with the *weak view* of material agency.

Verbeek tells us that *all* technological artifacts are *epistemically active* (2005: 9). Artifacts actively generate meaningful (semantically significant) situations by shaping the way human beings perceive and understand their situatedness. In the example of the blind man's cane, the cane is epistemically operative as a *tool for understanding*. It enables the blind man to *expand* his bodily sense of awareness *into the world* by virtue of the cane's material properties and the blind man's embodied way of being-in-the-world (see Ihde, 1990: 74). In order to explore these epistemic merits of material culture, the merits embedded in (*Q*), this paper will go on to address

what Verbeek terms a "*material hermeneutics*" (see also Ihde, 1990: 124-71; Ingold, 1996: 184; Verbeek, 2005: 121-45; and Wheeler, 1996: 209-36). A material hermeneutics is in concordance with *philosophical* hermeneutics, as the latter position is developed by Heidegger (1927) and Gadamer (1975, 1976), insofar it is understood as entailing the following two commitments: (i) that human understanding is *intrinsically context-sensitive*; and (ii) that the *relationality* between subject and object constitutes an existen*tial* ontological condition for all understanding.

1.4. Two caveats
1.4.1. Ontology

First of all, recent attempts to capture material agency by reference to the notion of "*materiality*" are fundamentally *flawed*, and, therefore, unable to conform to the ontological requirement of relationality. Consequently, while agreeing with Olsen (2003) that the notion of materiality has played a significant role in shifting focus *from* the metaphor of material culture as text *to* the hard physicality of social life, I also believe that the notion of materiality is now causing more problems than it actually solves. Here the paper turns against the strong view of Olsen (2003) and the metaphorical view of Tilley (2007). Second of all, relationality and symmetry often go hand in hand in studies attempting to explain the notion of material agency (see e.g., Latour, 1999; Olsen, 2003). I have reservations about this marriage of terms. While agreeing that relationality is necessary as an ontological base for the idea of material agency, I will lay out the argument that the notion of material agency is sound only if based in a relational *plus* asymmetrical ontology; otherwise not. Note that this move transcends the no principled difference approach of the strong view, and incorporates the qualitative difference between (*X*) and (*Y*) of the weak view.

1.4.2. Epistemology

Philosophical hermeneutics is not without its own serious problems. So, even though material hermeneutics is firmly rooted in philosophical hermeneutics, a material hermeneutics will deny the assumption of both Heidegger and Gadamer that all understanding is *linguistic* in nature. The major reason for this rejection is that the claim that the pre-structures of understanding are linguistic in character amounts to what Bickhard & Terveen (1995) calls a *linguistic idealism*: (i) it excludes to the periphery what material entities *do* in favour of what they *signify*; and (ii) it underestimates the possibility of a *non-linguistic* and *materially mediated*, but, nevertheless, hermeneutical account of human understanding.

2. The ontological condition

Landscapes, mountains, caves, walls, global warming, streets, speed bumps, the ozonhole, etc., are *not* "things". It is a mistake to ontologically categorize a landscape, a cave, or the ozonhole as a *thing* – i.e., as an observable, spatiotemporal entity, qualitatively demarcated from its spatial environment (Quinton, 1973: 44). Far more promising is Latour's concept of *hybrid actor*: hybrids are collections of both human and nonhuman actors (1999: 180). Equally is it a mistake to derive the material agency of landscapes, washing machines, cars, chairs, watches and computers from their *thingly character* (Olsen, 2003) or *materiality* (Tilley, 2007).

2.1. No nature (matter, object) and culture (subject, social) opposition

Here we encounter the first fundamental flaw in the recent discussion on agency and material culture – namely, the idea proposed by Tilley that material entities may "act back" upon human beings in virtue of their *materiality*. The reason why such a proposal is flawed reveals itself most

clearly when we consider why an ecological and relationally based ontology is incompatible – and renders obsolete – an ontological separation between nature (matter, object) and culture (subject, social). The example of choice is the *ozonhole*. Scientific results verify that there is a causal link between increasing levels of UV radiation and a rise in patients with skin cancer. In fact, being embedded within a causal nexus, having direct implication for human life, enables an ontological categorization of the "ozonhole" as a member of a shared world alongside other beings such as humans, plants and animals (the premise (*R*)). Additionally, it is possible to say of the ozonhole that its existence both *factually* – UV radiation increases chances of skin cancer – and *normatively* – one *ought* not spend too much time in the sun – *disciplines* which use-patterns and opportunities for action take shape. But there is something that we cannot attribute as a dispositional characteristic of the ozonhole. That is, we cannot attribute the quality of "agency" to the ozonhole as a disposition of its *materiality*. To help us understand why this is the case, we may consider Tilley's (2007) stipulative definition of the concept of "materiality"; here formulated in a study of the materiality of the *stone*:

> "(…) there is on the one hand a processual world of stones which takes place *oblivious* to the actions, thoughts and social and political relations of humans. *Here* we are dealing with '*brute*' materials and their properties. On the other hand there is the processual significance stones have in relation to persons and sociopolitical relations. The concept of *materiality* is required because it tries to consider and embrace subject-object relations *going beyond* the brute materiality of the stones (…)." (2007: 17: notes omitted; italics added).

The ozonhole may be understood in analogy with the example of the stone. It is one thing to consider stone as *material*; quite another to consider the *materiality* of stone. In addressing the stone by way of its materiality, the stone is no longer considered as an entity with material properties, but rather as an *abstracted representation* – i.e., as a meaningful sign in a sociopolitical context. The stone *from* its "*brute*" materials is substituted *for* its materiality, which Tilley takes to mean something "*other than*" the stone's material properties. The sheer materiality of stone is, it would seem, just shorthand for dealing with the sociopolitical significance of stones in subject-object relations. Problems, though, lurk just around the corner. The ozonhole – and *all* other material-cultural entities – simply cannot be explained in abstraction from their material properties; nor may they be accounted for in the dualistic vocabulary of nature (brute matter) and culture (materiality). As noted by Latour, *if* we employ a subject and object ontology, *then* the two – and *only two* – ontological categories cannot share history equally (1999: 149). That is, they cannot "*at the same time*" be at *root* of the "*same phenomenon*". Grounding (*P*) in a relational and context-sensitive ontology will enable us to avoid such dilemmas. Let me explain:

The ozonhole – and the stone accordingly – may be said to have the ontological status of an *affordance*. The concept of an affordance is the central theoretical construct of ecological psychology. It was developed by James Gibson (1979) in order to specify the ways in which the environment *lends* or *offers* itself for perception and action – that is, how the environment creates and shapes opportunities for action in relation to an organism (Scarantino, 2003: 950). Especially important for our purpose is Gibson's ontological definition of the concept of an affordance:

> "An important fact about the affordances of the environment is that they are in a sense objective, real, and physical, unlike values and meanings, which are often supposed to be subjective, phenomenal, and mental. But, actually, *an affordance is neither an objective property nor a subjective property; or it is both if you like*. An affordance cuts across the dichotomy of subjective-objective and helps us to

> understand its inadequacy. (…) *An affordance points both ways, to the environment and to the observer*." (1979: 129; note omitted; italics added).

So it is in the case of the ozonhole. It is objective, since it consists of a number of primary qualities; however, as an affordance its *affectivity* does not reside in its "nature" – in comparison to "nature" as an ontological category – since it is partly constituted by the activity of human beings. Likewise is it a social phenomenon. The ozonhole is socially significant for human beings. But it *is* not in the world as an abstract representation *per se*. Affordances should not be taken as the opposite of nature. So, it is not characterizable as a strictly cultural phenomenon either – in comparison to "culture" as an ontological category. In contrast, the ontological status of the ozonhole as an affordance entails a status as *quasi-objective*. By this I mean that its ontological status as an affordance implies that it is logically true to say of the ozonhole that it is a "something", and, furthermore, that a number of human and nonhuman actors are involved in its *constitution*. It follows, therefore, that the ozonhole – and *all* other material-cultural entities – are both (i) objective and subjective at *the same time*, and (ii) a *composition* whose ontology is constituted in an involvement whole of multiple reciprocal relations amongst human and nonhuman actors.[6] Hence, it is a mistake to derive agency from materiality if one means by materiality something dissociate from the material properties of a given entity.

2.2. Agency is not a substantial quality

This section discusses Olsen's (2003) contribution to the issue of material agency – that is, it is a discussion of the strong view of material agency. Of particular interest is that Olsen distances himself from Tilley's understanding of the concept of materiality – as abstracted representation – and stipulates his employment of the term as denoting a material entity's "*physical and 'thingly' component*" (2003: 87: italics added). It's important to emphasise that I agree with Olsen on a number of issues. However, if we continue to describe material agency as a property of materiality, then we will continue to sidestep any sensible analysis of the relationship of agency and material culture. In contrast to Olsen, whose position implicitly rests on the assumption that agency is a *substantial* quality of the entities *in and of themselves*, this paper favours the weak version of material agency: that (X) – a technology, for instance – and (Y) – a human subject – constitute a causally coupled system, and that human embodiment makes a *special* contribution to the agentive dimension of (X) (see, e.g., Gibson, 1979; Ingold 2005, 2006, 2007ab).

Importantly, with respect to (P), the material agency thesis, it is paradoxical to note that Olsen for the most part agrees with the argument put forth here. The paradox consists in the fact that Olsen on the one hand focuses on what things *do* in virtue of their "*thingliness*" and wishes to do so within a relational framework on the other. To begin with I will consider the issues on which Olsen and I agree. This statement pays evidence to Olsen's relational point of view:

> All we need to do is to think about moving around a house, a university campus or a city, to realize how they prescribe *programmes of action* that schedule and monitor our day-to-day activities (…). (2003: 97: italics added; note omitted).

The important assumption here is that houses, cities and other segments of material culture are considered as prescribing *programmes of action*. The phrase "programmes of action" is due to Latour (1999: 178). It is an ontological notion, and it designates that actions arise in *relations*. The fundamental claim is that *reality* has its foundation in a relational ontology. The phrase "programmes of action", therefore, refers as much to the intentions of human beings as it does to the functions of artifacts, without invoking an a priori dichotomy between humans and

nonhumans on the level at which the terms are applied (see e.g., Verbeek, 2005: 156). In particular, if one accepts a relational ontology, then one will also accept an additional claim: Human behavior cannot be fully explained without reference to a "*second agent*" – e.g., the house, the city, or the university. Suppose, for example, having to drive from Copenhagen to Berlin. One way to succeed would be to consult a cognitive map of the route, that is, to access a stored inner representation of how to get from the former to the latter. An alternative, and far more realistic, method might be to select the correct road in Copenhagen from, e.g., a roadmap, and then follow the signs until successfully arriving in Berlin. If one accepts the second story as the more persuasive of the two, several important aspects comes to light with respect to the notion of *material agency*. That is, *in the wild* it is not only human beings using artifacts; it is human beings *plus* artifacts co-shaping and co-constituting which use-patterns take prominent shape.[7] In fact, human beings are no longer to be considered as the sole actors of an activity: (*X*) – the roadmap, the road, the signs and the car – *causally coshape*, alongside (*Y*) – the human subject – co-shape the navigational success of the conducted activity, (*A*). The idea is that the driver's psychological innards and the road collaborate as "*equal partners*" in a successful completion of the activity. Awareness of this mutual partner's condition allows (*P*) to be stipulated accordingly:

> (*P*) is tantamount to the claim that material entities have causal agency, since material entities co-constitute real-time activities of human beings.

An implicit assumption of the relational view, at least as it is put forth by Latour (1999) and Olsen (2003), ties relationality together with a claim about ontological *symmetry*: Neither humans nor nonhumans have agency as a pre-established essence; rather, agency arises – for humans and nonhumans – only in relations. Hence, in a symmetrical and relational ontology the concept of "agency" applies *equally* to humans and nonhumans, with no qualitative difference between the two. Each is functionally equivalent with one another. The no principled difference view we have already categorized as the strong view of the material agency thesis. On the weak view, Gell (1998) has put forth the position that it is *non-contradictory* to assign agency to things, and that this move is sound *only if* the idea of material agency is based in a relational and *asymmetrical* ontology. Recall that the weak view is critical of any full-blown eliminativism, in the sense that an irreducible part of human activity is the first-person embodied perspective. This is the phenomenological heritage of the weak view (see Merleau-Ponty, 1945/2002: 77-83); and it's restated by Verbeek in his reluctance to accept a thoroughgoing symmetry (2005: 216).[8] This paper favours the weak view. It does so, because the strong view, based as it is on *functional equivalence*, fails to take into consideration the difference of embodiment between human and material agents. From this (*P*) may be defined as:

> (*P*) is tantamount to the claim that material agency is a relational and asymmetrical quality.

Let us turn now to the second interesting aspect of the joint collaboration between (*Y*) – the driver – and (*X*) – the signs, roadmap, car, etc. – in relation to (*A*). The involved agents *transform* one another reciprocally. This insight is due to Latour, who designates this kind of reciprocal transformation as "translation" (1999: 179). What it means is that the driver and, say, the signs *change* each other. The driver is *different* if in relation to the signs, that is, the driver-with-signs is now a competent driver, one capable of successful finding his or her way from Copenhagen to Berlin. The signs are *different* if in relation to the driver, since the signs-with-driver are no longer merely passive objects sitting by the wayside, but emerge as actors mediating the activity in virtue of the joint collaboration of "way finding". Note that something else is happing in this

example. There are two kinds of agents – humans and nonhumans – qualitatively different from one another. However, arising from the *mutual transformation* of human and nonhuman agents is a "*hybrid agent*": In the relation between the driver (actor 1), the road (actor 2), the car (actor 3) and the signs (actor 4) arises a new qualitatively different "hybrid actor" (actor 1 + actor 2 + actor 3 + actor 4). Because of this, within the causal nexus of human and nonhuman agents, (*P*) may take the following form:

> (*P*) is tantamount to the claim that hybrid agents may emerge from a joint collaboration of, and transformation between, human and nonhuman agents.

Now, why do these three formulations of (*P*) not concord with Olsen's additional claim that material entities have agency by virtue of their physical, thingly character? Consider, for example, an axe. If we follow the relational and asymmetrical definition of (*P*), as a programmatic assumption, it follows that the notion of material agency is incompatible with the view that material agency is an intrinsic quality of the axe *in and of itself*. On the other hand, however, if we ontologically define material agency as a product of the axe's physical, thingly character, it follows that the axe has agency qua its physicality or materiality – the power of agency lies with its materiality itself. This is the paradox plaguing the account developed by Olsen (2003). The notion of "environmental affordances" far better captures the ontological commitments of (*P*) than does Olsen's reference to a things thingly or physical character. This is so, because an affordance – e.g., the axe's ability to chop wood – is created (or arises) in a relational network consisting of the embodiment of the user and the material properties of the entity being used (see Gibson, 1979: 127). Allow me to explain in further detail.

We have already seen how Latour's notion of "programmes of action" is based in a relational ontology. Likewise for Gibson's concept of an "affordance". It refers to the complementarity between an organism and its environment (see e.g., Sanders, 1993). Because of this, the ontological status of an affordance is co-dependent on the circular causality between the subject and the material culture surrounding the subject (Gibson, 1979: 127). In order to keep things as simple as possible, let's return to the example of the blind man's cane (Ihde, 1990). The cane is an environmental affordance for the blind man. It *offers* distinct ways for the blind man to gestalt (or embody) his environment, while at the same time reducing the availability of others. Additionally, its material properties – i.e., its roughness, structural form, etc. – are capable of *transcending* the cane's significance as a social object. This aspect is essential if the cane, in virtue of its material properties, is to co-shape or form the way in which the blind man comes to know his world. However, it is essential to note that such an agentive capacity is possible only if taken in relation to the blind man's species-specific corporeality – that is, in relation to body posture, gripping abilities, and so on (for related insights on embodiment see e.g., Gibson, 1979; Johnson, 1987; Lakoff & Johnson, 1999; Sheets-Johnstone, 1999). On Ingold's weak view of material agency, the cane does not actively co-shape the coming forth of meaningful worlds by virtue of something *inside* it. Agency does not reside *in* matter – i.e., as an immaterial substance somehow controlling the cane. Nor does the cane act back upon us due to the power of its materiality, because agency, so Ingold claims, is not *of* matter *per se* (2007a: 12). Bringing things to life, then, is *neither* the work of an immaterial soul controlling matter *nor* is it a quality of the matter itself. Instead, the cane affords what it does by virtue of its position in a relational whole constituted by the material properties of the cane and the blind man's embodied nature of being-in-the-world. Hence is it possible to say persuasively of (*P*):

(i)   Material entities have "agency" as an ontological quality.

(ii)   Material entities have "agency" as an ontological quality *only if* the concept of "material agency" is a relational and asymmetrical quality – that is, agency is an attribute of material entities *only if* it is qualitative different than human agency and emerges in "symbiotic interplay" between human embodiment and material properties of material culture. *Therefore*:

(iii)   Material entities have agency qua their position in a relational and asymmetric network of human and nonhuman agents. *Hence* (it follows from the conclusion):

(iv)   Material entities do not possess agency as an intrinsic quality by virtue of their materiality (the argument posed by Olsen, 2003).

(v)   Material entities do not consist of nature and culture as two oppositional ontological categories, where the brute matter of material entities may be substituted for their significance in sociopolitical matters (the argument posed by Tilley, 2007).

3. The epistemological condition

Before we begin the present analysis of the *epistemic* influence of material culture, we need to remind ourselves of the claim embedded in the necessary epistemological condition, (*Q*), for (*P*):

> (*Q*) All material entities have *de facto* existing qualities that affect and shape the way human beings perceive and understand the world.

We are already in a position to appreciate the statement that things *act back* – that is, that things *do* something in the world. But remember, this view is sound *only if* material entities are positioned in an asymmetrical and relational ontology; otherwise not. Therefore, on the basis of the previous discussion in the paper, (*Q*) may be given the following definition:

> (*Q*) is tantamount to the claim that all material entities have *de facto* existing qualities that affect and shape the way human beings perceive and understand the world *only if* these material entities are based on an asymmetrical and relational ontology.

This implies that material culture, as a result of its necessary relation to other human and nonhuman agents, possesses the capability of transforming (ordering, evoking, directing) how the world is perceived by human beings. Before moving on it needs to be mentioned that material culture not only mediates perception and understanding. Given the engrained position of technologies and other material-cultural entities, their transformation capacity whenever embedded in human relations, such things may disclose new ethical dimensions.[9] Prominent advocates of this moral dimensions view of artifacts include Latour (1992) and Verbeek (2005), among others.[10] Other cases include human creativity, everyday cognition, and socially distributed cognition (see e.g., Brooks, 1999; Clark, 2003; Hutchins, 1995; Norman, 1988, 2005).[11] In the philosophy of technology, a subfield within material culture studies, Ihde (1990) and Verbeek (2005) have developed an epistemology of material culture known as *material hermeneutics*. It is a position highly valuable for the present aim of this paper. In fact, it presents us with important tools in order to unlock the myriad ways in which material culture may *epistemically* influence and co-constitute human perception and understanding.

3.1. Material Hermeneutics

Hermeneutics is usually defined as the theory and practice of interpretation. Historically it involves a long and complex history, starting with concerns about the interpretation of legal and sacred texts. In the twentieth century, hermeneutics broadens to encompass questions about the conditions of possibility for human understanding. The difference is between *classical*

hermeneutics and *philosophical* hermeneutics. The present discussion of (*Q*) is interested in hermeneutics as *philosophical* hermeneutics insofar it is, as formulated by Heidegger (1927) and Gadamer (1975, 1976), concerned to raise questions about the conditions of possibility for understanding and interpretation. Importantly, this is not a question of how we *should* interpret or understand something, but rather what interpretation and understanding *is* and how they *work* (see, e.g., Gallagher, 2004; Wheeler, 1996).[12] Central for a "*material* hermeneutics" is Heidegger's (and Gadamer's) assumption that human understanding is *intrinsically context-sensitive*, and that the *relationality* between subject and object constitutes an existen*tial* ontological foundation for all understanding. Assumptions elegantly captured by Heidegger in his ontological stipulation of human beings as a priori "*In-der-Welt-sein*" (1927/2001: 53: italics in original).[13] Heidegger's paradigmatic example is the *hammer* example. Let me clarify.

First of all, if we focus on the hammer as a piece of equipment, then it becomes apparent, so Heidegger informs us, that each piece of equipment is related to a context. In itself it is nothing; as a piece of equipment it necessary presupposes being part of a meaningful whole. This is essential for a material hermeneutics: (i) it underscores that technologies do not have significance *in and of themselves*; and (ii) because technologies are always interwoven in a cultural praxis, they are always in a position to transform culture and how it is experienced (Ihde, 1990: 164-77; Verbeek, 2005: 138). Second of all, the field within which a piece of equipment is what it is, Heidegger denotes as an *involvement-whole*: A context filled with complex cross-relations between different pieces of equipment. In this sense, a tool is always "something in order to" and this "in order to" always refer to a tools utility; that *for which* it is usable (Mulhall, 1996: 48). One might say that the hammer's usability does not refer back to the hammer itself, but rather is directed at a certain context of involvement. This is important for a material hermeneutics, because it points to the *non-neutrality* of artifacts. That is, it refers to the presupposition that artifacts are more than merely instruments; that artifacts actively influence how they are to be used. In fact, *if* technologies are considered only as neutral instruments, *then* this would imply that technologies are *nothing over and above* their cultural interpretation and ways of use. However, *if* technologies are so understood, *then* the technologies are reduced to interpretation – to a symbolic sphere ignoring the epistemic *operativity* of the technologies themselves. Therefore, technologies are more than mere symbolic interpretation, because they actively co-constitute the way reality comes into being for human beings (Ihde, 1990: 141). Third of all, the usability of tools discloses the tools as being manifest in their *readiness-to-hand*. It is characteristic of something ready-to-hand that it *withdraws*, phenomenologically speaking, from the attention of the user *in order to be used*. Essentially, a withdrawing tool becomes a *means* through which human beings experience the world rather than an *object* of experience. For a material hermeneutics this is an important insight, since it reveals a sense in which technologies impact the epistemic encounter human beings have with the world.

3.1.1. The problem of viewing language as the medium of understanding

Philosophical hermeneutics and a material hermeneutics share a common goal. Both attempt to extend the boundaries of classical hermeneutics to include humans and world in the interpretative loops of human understanding. But though this agreement is apt, they depart on one very important issue. A material hermeneutics denies the commitment of philosophical hermeneutics to confine all understanding to language. That is, it is a denial of the commitment to view all understanding as ontologically a matter of interpretation, and interpretation as ontologically constituted in terms of an historically situated language.[14] *If* understanding is ontologically a matter of interpretation, *and* interpretation is ontologically constituted in language, *then* it follows that language provides and circumscribes the epistemology of human beings and their access to

the world. The problem with such a commitment is that it constructs a "*linguistic idealism*" (see e.g., Bickhard & Terveen, 1995; Hacking, 2001; Olsen, 2006). It is an idealism that (i) *overlooks* that "things" (broadly defined) cannot adequately be defined in terms of interpretation, for this reduces them to the domain of the symbolic (Verbeek, 2005: 9). (ii) It *ignores* that material culture *is* in the world and plays a fundamentally different constitutive role for the way human beings are in-the-world than text and language (Olsen, 2003: 90). (iii) It *excludes* to the periphery what material entities *do* in favor of what they *signify*. And (iv) it *underestimates* the possibility of a genuinely non-linguistic and materially mediated, but, nevertheless, distinctly hermeneutical form of understanding. With these conceptual issues out in the open, it is now time to move on and elaborate the position of material hermeneutics as put forth by Ihde and Verbeek.

3.1.2. The epistemic character of material culture

How may the technological life-world change and affect how human beings interpret meaningful situations in the world? According to both Ihde and Verbeek, technologies may do so in two different ways. On the one hand, via "direct mediated perception": when technologies are directly involved in the mediation of sensory perception by shaping the way in which humans perceive reality (Verbeek, 2005: 128). On the other hand, via "indirect mediated perception": when technologies form the cultural framework available for interpreting a situation in the world (Verbeek, 2005: 128). Mediation implies *transformation* of perception in both direct and indirect modes of technologically mediated understanding. Importantly, mediation does not concern the *function* of a given technological artifact, but arises on the *basis of* its functionality in virtue of influencing (shaping, directing) understanding of events from an absorbed and incorporated position (Verbeek, 2005: 208). Hence, when speaking of material entities having *de facto* existing qualities affecting and shaping human understanding, it is the notion of *mediation* this paper has in mind. Ihde also characterizes this mediating role of technology as "*technological intentionality*" (Ihde, 1990: 141). By this he means that technologies are not neutral – mere instruments to achieve certain goals – but have a specific *directionality* which promote or evoke which use-patterns take prominent shape and, moreover, how reality comes to be meaningful for human beings. Nothing of this amounts to the claim that technologies have *determinative force*; they do not determine action in a strict sense. The point is merely that technologies – to a certain degree – evoke a specific usability and thus co-determine the way they are to be used. To get a feel for this way of speaking of technology, let's consider a couple of concrete examples.

3.1.3. Direct mediated perception

Suppose that you are travelling though a landscape by train. First of all, you are not travelling across, but *through* a landscape. Moreover, you are *in* a landscape. That is, you are not *in* a landscape as, e.g., water is *in* a glass, or as clothes are *in* a closet (Heidegger, 1927/2001: 54), since a landscape is a landscape only for those engaged with it: travelling alongside its many surfaces; dwelling in it; etc (Ingold, 2000: 193). Therefore, being *in* a landscape means to be confidential with it, since it is tantamount to always already being in *meaningful* situations. Second of all, travelling by train is a journey undergone from a certain point of view (an embodied perspective): through a window; in a sitting body position; and at high speeds. Consequently, this way of being in a landscape implies that your experience of the landscape is mediated *through* the train in which you are sitting. If we concentrate on the view from the window, then your point of view is *enframed* by the window. It is impossible to see the entire landscape, not even if you were to turn around. Only an enframed segment of the landscape affords visibility. In direct mediated perception, so Ihde and Verbeek inform us, an inherent structure of "magnification and reduction" is present. This means that when looking out the

window your perception of the landscape is *magnified* and *reduced at the same time*. The window magnifies the perceptual presence of that which is enframed; whereas it reduces from your field of experience the rest of the landscape. In this sense, a journey taken by train through a landscape is *co-shaped* by the train itself. This is a case of the *weak view* of material agency. In contrast to the strong view motivated by parity of contribution, this case illustrates that specific features of the human body make a *persistent*, *non-trivial* contribution to (*A*), all the while (*X*) itself, whenever causally coupled to (*Y*), importantly *transforms* the qualitative character of (*A*).

3.1.4. Indirect mediated perception

From bodily-perceptual mediated perception, it is now time to analyze how meaning arises when the cultural frameworks of interpretation are mediated by technologies. To this purpose I will make use of Latour's example of a speed bump, which *forces* the drivers to adapt their behavior qua its material presence (1999: 185-90). First of all, and in line with Heidegger, speed bumps do not have use-value *in and of themselves*. Instead, speed bumps presuppose, as a necessary (transcendental) condition, a cultural praxis wherein they can be what they are. What do I mean by this? Gibson's concept of an "environmental affordance" makes the notion of "use-value" intelligible – whereby I mean how speed bumps *offer* certain patterns of use in relation to the users. Recall, an affordance is a given entity's qualitative properties in relation to a user; it is not a qualitative property of the users' *experience*. Therefore, the use-value of a speed bump – qua its ontological status as an environmental affordance – is neither a property of the speed bump *in itself* nor the result of subjective values projected onto the world by a subject. In contrast, the use-value of a speed bump emerges in the active and relational partnership of "*human-technology*" (see Ingold, 2000: 194; Verbeek, 2005: 117). Second, because technologies are always interwoven in a cultural praxis, they are always already in a position to transform culture and the way it is experienced (Ihde, 1990: 164-77; Verbeek, 2005: 138). *Qua* their manner of implementation, a speed bump co-shapes a coming into being of a cultural space mediated by technology. That is, a cultural space in which the speed bump is implemented is co-constitutive of indirect forms of cultural interpretations of situation in the world. As noted by Latour, whenever a speed bump mediates programmes of action, a possible *translation* occurs *from* occasional hazardous driving and breaking of the rules *to* a more disciplined style of driving in virtue of its technologically mediated *intentionality*. So, inscribing a program of action into a lump of concrete delegates the task of a policeman (or traffic sign) to the speed bump. It demands a decrease in speed and, therefore, evokes a cultural space for acting a certain way.[15]

As we saw earlier, for Gadamer language is the medium through which understanding is constituted. But, *if* technologically mediated intentionality gives rise to indirect forms of cultural interpretation, *and* such understanding is co-constituted by non-linguistic entities – e.g., a lump of matter in the road – *then* it follows that cultural significance (meaning) cannot be constituted in language *per se*. Therefore, *if* human understanding is not primarily linguistic and a distinctly hermeneutical account of understanding still makes sense, *then* technologically mediated perception may be able to affect us in fundamental ways which constitute non-linguistic, but, nevertheless, hermeneutic forms of understanding. All this considered we may define (*P's*) epistemological capacity in the following way:

(i)   Material entities have "agency" as an epistemological quality.
(ii)   Material entities have "agency" as an epistemological quality *only if*
the concept of "epistemic agency" is tantamount with "technological intentionality" and co-constitutive of non-linguistic, materially mediated forms of understanding. *Therefore*:

(iii)   Material entities are "epistemic agents" in virtue of technological intentionality and being co-constitutive of non-linguistic, materially mediated forms of understanding.

4. Conclusion

This article has attempted to articulate a theoretical framework, the target of which has been to systematically unearth the conditions validating (*P*), *The Material Agency Thesis*: Material entities have, ontologically and epistemologically, the quality of *agency*. I have advanced the argument that (*P*) is true *only if* an ontological condition and an epistemological condition are true. With respect to the discussion of (*R*), the ontological condition, this paper has argued that the claim that material-cultural entities have "agency" as an ontological quality is persuasive *only if* the notion of "material agency" is based in a relational and asymmetrical ontology; otherwise not. In considering (*Q*), the epistemological condition, this paper has put forth the view that the claim that material-cultural entities act as "epistemic agents" is justifiable *only if* they are considered as being co-constitutive of non-linguistic and materially mediated forms of human understanding; otherwise not. Hopefully this way of dealing with the issue of material agency, getting clear about underlying conditions, as well as separating the strong and weak views from each other, has been of some help in raising a constructive framework for future analysis.

Acknowledgements

References

Bickhard, M., and L. Terveen. 1995. **Foundational Issues in Artificial Intelligence and Cognitive Science**, Amsterdam: Elsevier Science Publishers.
Bille, M., and T. Sørensen. 2007. "An Anthropology of Luminosity: The Agency of Light," *Journal of Material Culture* 12 (3): 263-84.
Brooks, R.A. 1999. **Cambrain Intelligence**, Cambridge, Mass.: The MIT Press.
Böhme, G. 1995. **Atmosphäre**, Frankfurt am Main: Suhrkamp.
Clark, A. 2003. **Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence***, Oxford and New York: Oxford University Press.
Dreyfus, H. 1991. **Being-in-the-World: A Commentary on Heidegger's Being and Time**, Division 1, Cambridge, Mass.: The MIT Press.
Gadamer, H.G. 1975/2004. **Sandhed og Metode**, Viborg: Systime Academic.
Gadamer, H.G. 1976/2004. **Philosophical Hermeneutics**, Berkeley: University of California Press.
Gallagher, S. 2004. "Hermeneutics and the Cognitive Sciences," *Journal of Consciousness Studies*, 11 (10-11): 162-74.
Gibson, J.J. 1979. **The Ecological Approach to Visual Perception**, New Jersey and London: Lawrence Erlbaum Associates, Publishers.
Hacking, I. 2001. **The Social Construction of What?,** Cambridge, Mass.: Harvard University Press.
Heidegger, M. 1927/2001. **Sein und Zeit**, Tübingen: Max Niemeyer Verlag GmbH.

Hutchins, E. 1995. **Cognition in the Wild**, Cambridge, Mass.: The MIT Press.

Ihde, D. 1990. **Technology and the Lifeworld**, Bloomington: Indiana University Press.

Ingold, T. 1996. "Situating Action V: The History and Evolution of Bodily Skills," *Ecological Psychology*, 8 (2): 171-182.

Ingold, T. 2000. **The Perception of the Environment: Essays in Livelihood, Dwelling and Skill**, London and New York: Routledge.

Ingold, T. 2005. "Landscape Lives, But Archaeology Turns Into Stone," *Norwegian Archaeological Review,* 38 (2): 122-29.

Ingold, T. 2006. "Rethinking the Animate, Re-animating Thought," *Ethnos*, 71 (1): 9-20.

Ingold, T. 2007a. "Materials against Materialism," *Archaeological Dialogues*, 14 (1): 1-16.

Ingold, T. 2007b. "Writing Texts, Reading Materials. A response to my critics," *Archaeological Dialogues,* 14 (1): 31-38.

Johnson, M. 1987. **The Body in the Mind**, Chicago and London: The University of Chicago Press.

Kadar, E., and J. Effken. 1994. "Heideggarian Meditations on an Alternative Ontology for Ecological Psychology: A Response to Turvey's (1992) Proposal," *Ecological Psychology*, 6 (4): 297-341.

Lakoff, G., and M. Johnson. 1999. **Philosophy in the Flesh: the embodied mind and its challenge to western thought**. New York: Basic Books.

Latour, D. 1992. "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts," in: Bijker, W. E., & Law, J (eds.) **Shaping Technology/Building Society**. Cambridge, Mass.: The MIT Press.

Latour, B. 1993. **We Have Never Been Modern**, Cambridge, Mass.: Harvard University Press.

Latour, B. 1999. **Pandora's Hope: Essays on the Reality of Science Studies,** Cambridge, Mass.: Harvard University Press.

Merleau-Ponty, M. 1945/2002. **Phenomenology of Perception**, London and New York: Routledge & Kegan Paul.

Mulhall, S. 1996. *Heidegger and* **Being and Time**, London and New York: Routledge.

Norman, A.D. 1988. **The Design of Everyday Things**, New York: Basic Books.

Norman, A.D. 2005. **Emotional Design: Why We Love (or Hate) Everyday Things**, New York: Basic Books.

Olsen, B. 2003. "Material Culture after Text: Re-Membering Things," *Norwegian Archaeological Review*, 36 (2): 87-104.

Olsen, B. 2006. "Scenes From A Troubled Engagement: Post-Structuralism and Material Culture Studies," in: C. Tilley, W. Keane, S. Küchler, M. Rowlands, and P. Spyer (Eds.) **Handbook of Material Culture**. London: Sage Publications.

Sanders, J.T. 1993. "Merleau-Ponty, Gibson, and the materiality of meaning," *Man and World,* 26: 287-302.

Scarantino, A. 2003. "Affordances Explained," *Philosophy of Science*, 70 (December): 949-961.

Sheets-Johnstone, M. 1999. **The Primacy of Movement**, New York and Amsterdam: John Benjamins Publishing Company.

Quinton, A. 1973. **The Nature of Things**, London and New York: Routledge & Kegan Paul.

Tilley, C. 2007. "Materiality in Materials," *Archaeological Dialogues*, 14 (1): 16-20.

Verbeek, P. P. 2002. "Devices of Engagement: On Borgmann's Philosophy of Information and Technology," *Techné: Research in Philosophy and Technology*, 6 (1): 69-92.

Verbeek, P. P. 2005. **What Things Do: Philosophical Reflections on Technology, Agency, and Design**, Pennsylvania: The Pennsylvania University Press.

Wheeler, M. 1996. "From Robots to Rothko: the Bringing Forth of World," in: Boden, M. (ed.) **The Philosophy of Artificial Life**. Oxford and New York: Oxford University Press.

Wheeler, M. 2005. **Reconstructing the Cognitive World**, Cambridge, Mass: The MIT Press.

Endnotes

1   This way of putting things suggests that the things pertaining to material culture are things already transformed by human activity, into artifacts. According to Ingold, we should bracket this metaphysical view, since it unjustifiably carves the material world into two opposite categories: one cultural; one natural (Ingold 2007a: 3-4). In setting up this framework, this paper will follow Ingold in advocating the view that the adjective "material culture" covers both cultural artifacts and natural kinds. Generally speaking, material culture is taken to include both things encountered *in situ*, within the landscape, and things already transformed by human activity. More specifically, since there does not seem to exist a demarcation line clearly distinguishing surface (land) from the medium (air) surrounding it, such naturally encountered phenomena as sunlight, air and rain are included as constitutive parts of our material cultural world.

2   This argument is derived from Olsen (2003). However, it is not provided by Olsen! Instead, the argument has been derived from several key passages in Olsen (2003). These passages are as follows: (*P*) "[We] have to relearn to ascribe action, goals and power – or to use that old mantra, *agency* – to many more agents than the human subject, as well as to ballast epistemology – and ontology – with a new and unknown actor; the silent thing." (2003: 89; italic in original); (*R*) "(…) all those physical entities we refer to as material culture, are beings in the world alongside other beings, such as humans, plants and animals. All these beings are kindred, sharing substance ('flesh') and membership in a dwelt-in world." (2003: 88; note omitted); and (*Q*) "Things, objects, landscapes, possess '*real*' qualities that affect and shape both our perception of them and our cohabitation with them." (2003: 88; italic added).

3   One might wonder why I infer two criteria for material agency suggested by Olsen. I do so, because both criteria point to important aspects underlying the initial plausibility of material agency, and because both criteria are able to encompass both the weak view and the strong view of material agency suggested in section (1.1).

4   This example was originally introduced by Merleau-Ponty (1945/2001: 165). Recently the example has been employed by Ingold (2000: 18) and Verbeek (2005: 124). See also the work of Heidegger (1927) for related insights.

5   The influence of both Heidegger (1927) and Merleau-Ponty (1962) is evident here.

6   The term "composition" is a technical term introduced by Latour (1999: 180-83). It serves the purpose of emphasizing that the ontological structure of every action is nested in a series of many actors – human as well as nonhuman.

7   I use the phrase "in the wild" with a nod to Hutchins "Cognition in the Wild" (1995).

8   According to Verbeek, there is a genuine phenomenological difference between humans who act and a world of things in which action takes place (2005: 216).

9   For an ingenious example of how *light* may enter into moral dimensions see Bille & Sørensen (2007).

10 It would be a mistake simply to conflate the views of Latour with those of Verbeek on this matter. The former holds a symmetrical view of human-technology relations, whereas the latter does not. One argument, given by Verbeek, for the necessity to take the moral dimension of things seriously, turns on *mediation*. Everyday things – surgical equipment, bridges, speed bumps, etc. – transform our practical lives; they have an impact on our behavioral choices. Sometimes we perform certain types of behavior in need of moral assessment – e.g., when having to decide whether or not to have an abortion. In the case of obstetric ultrasound, technologies not only causally influence the situation. On Verbeek's view, such a technology transforms the situation of expecting a child into a situation of having to make a substantive moral choice – deciding whether the fetus is entitled to life or not.

11 For an argument on how *atmosphere* is co-constituted by material-cultural entities see Böhme (1995).

12 Given the complexity of the work of both Heidegger (1927) and Gadamer (1975), and taken the restricted length of this article into consideration, it is not possible to provide deep insight into the work of these two scholars. What is to follow is therefore substantially comprised and oriented towards to current thematic, and several theoretical nuances will be left unsaid.

13 The claim that the relationality between the human experiencer and the field of experience constitute an existential ontological foundation for all understanding means the following: a necessary structural condition for human understanding is that it always needs be understood in relation to the context in which the human experiencer is situated*,* and, accordingly, is experiencing (and understanding).

14 Just consider this quote from Gadamer: "All thinking is confined to language, as a limit as well as possibility." (1976/2004: 127).

15 To quote Verbeek: "When a cultural relation with an artifact is initiated, there arises a '*cultural intentionality*' within that relation (…)." (2005: 138: italics added; note omitted).