

Against The Perennial: Small Steps Toward a Heraclitian Philosophy of Science

Joseph C. Pitt
Virginia Tech

My philosophical career has been centered on the search for a philosophically adequate, i.e., universal and perennial, account of scientific change. However, it has slowly dawned on me that efforts to find a single theory of how science changes seek the wrong grail. Not only has the search for a perennial, systematic, and universal explanation of scientific change been mistaken, but any such effort with respect to any of the major concepts we employ to discuss and analyze the sciences and our technologies is not only doomed, but also rightfully fuels the idea that philosophy is irrelevant. The idea of the perennial lays out the philosophical landscape as if it were static. However, a little reflection on the history of philosophy immediately tells us this is not so. The landscape changes, as it should.

One of the ways the philosophical landscape changes is that new areas of philosophical concern develop. One of the more recent of these areas is the philosophy of technology. For most of the last century, it has been a field in search of a place to fit. Part of the failure to see the philosophy of technology as a legitimate part of the philosophical landscape is due to the current commitment by contemporary philosophers to the perennial, i.e., to philosophy as a set of fundamental questions that do not change over time. There is also an additional assumption, to wit, that should we find answers to these questions, they too would be perennial. In what follows, I challenge that view.¹

Because of its long history, we tend to think that philosophical concerns have basically remained the same over time. This is due in part to our general insistence that philosophical questions are perennial, without really looking at their historical dimensions seriously—good historians of philosophy do this, but the rest of us seemed to have missed the message. (see Ariew (2000)) We import current concerns and analytic techniques like formal logic into the work of earlier philosophers, making it seem as if our concerns were always present to the minds of now dead philosophers. In so doing we readily ignore the historical social contexts in which philosophy is done. When we pay attention to historical contexts we also see that few, if any, philosophical questions are perennial except in the most trivial sense.² It is only when we accept the historically contextualized nature of philosophy itself that we can truly understand its history,

and only then can we understand the emergence of new areas of philosophical concern such as the philosophy of technology.

In this paper, I first offer a metaphor through which I propose we conceptualize the dynamics of philosophical change. This is the metaphor of landscapes, continents and plate tectonics. I then identify two new problems which have been raised regarding technologies and artifacts and I attempt to address them through a traditional analytic framework. In the end, I conclude that this cannot be accomplished and I propose an alternative account grounded in the framework of historically contextualizing the problems.

Continents

To set the stage, consider the metaphor of a “landscape”. The traditional view of philosophy can be understood in the language of continents. We traditionally break Western Philosophy into six major divisions—albeit arbitrarily. Roughly seen, they are Value Theory, Epistemology, Metaphysics, Logic and History of Philosophy. Further, they are usually portrayed as fixed in location and general outline. However, if we see Western Philosophy as a 2500 year conversation, it seems inevitable that any such set of distinctions when exposed to that amount of working and reworking will eventually collapse. I will return to that point at the end.

Nevertheless, if these are the continents, the question becomes on which one(s) do we find the philosophy of technology? Surely that depends on how the philosophy of technology is characterized.³ And given the range of issues that arise in the philosophy of technology taken broadly, it is not surprising to find outposts on each continent.

Thus:

- *Value Theory* – includes ethics, action theory, social and political philosophy, aesthetics, and moral philosophy, and it alerts us to normative questions concerning the origin of technological projects and the consequences of technological innovation, among others.
- *Epistemology* – including some areas of philosophy of science, philosophy of language, and logic, addresses question of the foundation of technological assessment, for example.

- *Metaphysics* – including some aspects of ethics, philosophy of science, aesthetics, philosophy of language, and logic, turns us to the status of technological objects and processes.
- *History of Philosophy* – all of the above plus as much gossip as you can squeeze in—is used to plot the impact of technological innovation on the human condition, etc.

Philosophy of technology is everywhere, hence, nowhere. On this view, the landscape metaphor fails to illuminate.

Tectonics

The failure of the landscape metaphor does not mean we have to abandon talk of continents. We can change our static model of continents to the dynamic view that continents sit on floating plates that are constantly moving and colliding with one another. The result of this change of the model is that while there is much activity underwater, the major visible changes occur on the continental surfaces. This, I think brings us closer to a reasonable way to look at issues in the philosophy of technology and it may force us to conceive of philosophy in an altogether different light. For example, I propose the not unreasonable thesis that social, cultural, and economic forces play a role in the changing character of philosophy and that these can, at first pass, be understood in the context of the metaphor of tectonic plates as the plates themselves. Philosophical change is often a response or reaction to social change. The changes and the meaning of a new philosophical landscape must be understood against the background of social and cultural change. However, philosophical ideas themselves are also causal factors that create change. For example, consider the impact on contemporary American society of the idea that a woman should have the right to control her own body. The consequences have been revolutionary. This simple idea has forced revisions of our work arrangements, assumptions about gender, family relationships, social roles, the law, etc. Further, I am convinced that we have not yet seen the full set of consequences to follow from a complete working out of this notion. So the relations among philosophy, social and cultural change, economics and politics are complex, non-linear, and cannot possibly be understood in the abstract.

There has been a spate of new work from people like Peter Galison (1998), Davis Baird (forthcoming), with antecedents in the work of Gaston Bachelard (1938) and Ian Hacking (1982), that have in common some epistemological concerns,

especially the ways in which human knowledge is “embedded” in technological artifacts. Let me refer to this group of scholars and others worrying the same and similar issues as The New Technists. I say these are new issues—it may be that Heidegger (1954) had something to say about this—but, not in the way the New Technists have—for they are concentrating on actual artifacts and the manner in which they reflect human knowledge. The heart of the matter is that by concentrating on the way in which artifacts are the product of human activity, and yet stand alone in some sense,⁴ new dimensions of epistemological concern have been opened up.

For example: if, as some of the New Technists argue, artifacts embody knowledge, then we need to find an account of knowledge that makes sense of this idea. The traditional philosophical discussions of knowledge as justified true belief (JTB) won’t work here. . This issue of the definition of “knowledge,” and similar sites, remind me of eruptions and similar geographical changes that occur when tectonic plates collide.

These kinds of issues can’t be located in the traditional philosophical static continental landscape—they can better be understood, as emerging from the clash of tectonic plates, and the movements of the “plates” are powered by technological innovation and change. In short, the arrow moves from technological innovation to social change to philosophical change. However, be alert to the fact that any such singular conception of order will surely be falsified by the historical record. What is proposed here is at best a schema to assist in reorienting our thinking about these relationships.

Today the issues that newly raise their heads concern how to understand or to characterize a world increasingly dominated by man-made artifacts.⁵ The traditional philosophical questions of the good life or the nature of reality or knowledge have been reconfigured in the light of strange, even perverse questions concerning the things we have made. These are new problems. As noted above, one such problem is how these artifacts embody human knowledge. Thus, to borrow from a talk by Davis Baird, we can read time off the face of a watch without knowing how the watch works, but we can only do that because the watch, as artifact, embodies the knowledge of its makers. This is not the same problem as differentiating between theoretical knowledge and craft knowledge, or between knowing how and knowing that because, it is claimed, the object needs, requires, nay, *embodies* the theoretical knowledge and the knowing that—but just how is the question. If the term “embodies” creates problems, as it

does, substitute for it the general problem of explaining the way in which an artifact reveals, instantiates, reflects, the knowledge of its maker.⁶

A second manifestation of this new set of problems concerns the way in which artifacts embody *meaning* in the same way or similarly at least as paintings and novels do. Again if “embody” creates problems, look at the general issue.

These two questions seem to highlight a shift in our philosophical focus. In the first case, it is not a question of what “knowledge” means, but how it is manifested in the product of our labor. Likewise, the question of the meaning of artifacts does not seem to signal a call for a semantic analysis of objects, but rather asks for a performative account of what the objects say about themselves and maybe even us.

The standard analyses of “knowledge” are not going to work when we ask how artifacts embody human knowledge. Let’s look briefly at a couple of tries: (1) in the standard account of knowledge as Justified True Belief, (JTB)—our belief that something is the case counts as knowledge just in case that belief is justified and it is true. When we turn to artifacts the epistemic status of belief is not the issue—nor is truth nor is justification. Those questions don’t make sense when we try to unpack the sense in which *an object* embodies knowledge, for objects do not have beliefs. (2) If we take a different account, say a pragmatic theory of knowledge, the usability of an object or the consequences of its use tell us little about how human knowledge is embedded in the object itself. For one thing, the use to which the object is put may not reflect its intended use, e.g., the birth control pill. It may be that part of the problem here lies in the use of the word “embody”. But it is hard to find another terms that does not create its own set of problems. Consider: one problem with saying artifacts embody knowledge is the implication that having done so the object has some form of agency, and that seems to some counter-intuitive. It has been suggested that we replace “embed” with “reflect”. But it is not clear to me how this solves the problem. In fact, it seems to me to beg the issue. The question remains how an artifact reflects the knowledge of its maker. Must the artifact have a shiny surface? Isn’t “reflect” metaphorical here? It doesn’t matter—what remains is the problem of elucidating the nature of the epistemological relationship(s?) between artifact and maker. Note here how complicated that relationship can be. In today’s technological world, we are not talking about one person making one object. There is a design process, which is translated into a manufacturing process, which may or may not be broken down into components, there is an assembly

process, there are workers and there are supervisors. How much does each need to know and whose knowledge from that team is reflected in the artifact? These are all neat, new questions.

Similarly when we turn to meaning. If we ask the question how objects bear meaning, we are not asking for the significance of the object in our lives. We are asking for something different (for example, the significance of the object in its own right). Meaningful objects are things like the World Trade Center, the Eiffel Tower, the Taj Mahal. Are they only meaningful because we say so, or do they embody meaning by themselves?

So, on the one hand, it appears that if we take seriously the questions raised by the increasing dominance of complicated and complicating technologies in our world we will have to ask and solve different kinds of philosophical questions. But, on the other hand, this seems odd.

Both the possibility of different kinds of questions and the oddness, I propose, are due to a continued reliance on the old model of fixed continents. That is, if these really are new questions, then to answer them we have to abandon the view that philosophical questions are perennial. If these really are questions in the philosophy of technology, then we seem to have to do one of two things: either (1) add a new field called the philosophy of technology and try to figure out how it fits in with the others, or (2) subjugate the rest of philosophy to these newer concerns. The first of these options seems to me to characterize the history of the philosophy of technology in the 20th century. Efforts to legitimize the philosophy of technology have proceeded by trying to set it up as a new branch of philosophy. The second approach keeps trying to raise the flag, but it is having a hard time finding a mountain top on which to stand—see the scene in John Bormann's 1981 film, *Excalibur*, when Arthur, flush with victory creates the fellowship of the Round Table. You need a mountain top from which to declare a new order.

On the other hand, what if we take the plate tectonics metaphor more seriously? The collision of plates and continents does not leave one the victor and the other vanquished—nor does it result in different kinds of things, we still have mountains, rivers, valleys, just in new arrangements. Rivers get diverted, new mountain ranges rise and where there are oceans, deserts come to be. What does this say about these new issues in the philosophy of technology? It strikes me that among some of the things that can be offered is a possible explanation of why

these new issues stand so starkly against the philosophical landscape and still do not ring true from a phenomenological perspective.

Meaning

Coming to the issue from an analytic stance, consider the question “Can artifacts mean anything in and of themselves?” From that perspective, I would think not. The rejection of the idea that artifacts have meaning or the ability to communicate their meaning is based on the same reasons we would conclude novels do not mean anything. This is not to say that the words, sentences, paragraphs, etc. in a novel cannot be said to express this or that. It is, rather to deny that a novel, or a hammer, in and of itself has some independent “meaning”

From an analytic point of view, to say a word means this or that is to imply there is a semantics involved—i.e., a set of rules for determining how a word or an object can be said to stand for this or that. In short, for an object to “bear meaning” is to place that object in the logical space of symbols, which is to say we know how to reason about it—how to make inferences with regard to it. This is my version of the Peircean/Sellarsian/Wittgenstein “use” theory of meaning, wherein the meaning of a word is its use or the role it plays in the complex of inference patterns of our language. We take symbol *x* to “stand for” *y*—but there is nothing inherent in *x* that it be a “stand for” sort of thing. That is, when we accept that *x* is a stand for sort of thing, we accept it as a symbol in our system of symbols—on the other hand to say of an object that it has meaning *simpliciter* is to say something different, or is it?

Two viable options present themselves: (1) We can say objects have no meaning outside our symbol systems, or (2) objects do have or bear meaning—it is just that the symbol system isn’t ours.

If we agree that objects only have meaning in the context of one of our symbol systems, then we *can* talk about the meaning of a novel, because we can say that it stands for an expression of this or that sentiment or insight into the human condition, and we know how to reason about those sorts of things. The meaning of “meaning” in this context is metaphorical.

On the other hand, if we say of an object that “it has meaning or bears meaning in and of itself”, and by that we mean “independent of our symbol systems”, then we are on the dubious road to what is called the metaphysical reification of

meaning. This is an unjustified and unjustifiable move. It gives us meanings in the world—something that cannot be determined outside of some interpretive scheme. There are many such schemes. Assigning meaning to anything requires the use of some such scheme. But even though some scheme or other must be used to assign meaning to anything, it is not necessarily the “right” scheme. To determine that we do in fact have the right scheme by which to assign meaning to a thing implies that we can argue about the object’s *real* meaning independent of seeing it as a symbol while using a symbol system to accomplish that end. That makes no sense. That is, we cannot conclude that objects embody meaning simpliciter using a symbol system in which meaning is contextual in some form or other. To say that we can is to wallow in post-modernist fantasies.

Another option, one equally unpleasant, is to suggest that the real meaning of *x* is determined through a symbol system alright, but one to which we do not have access—something like an appeal to God—at that point we have left the room of reasoned discussion.

From an analytic standpoint, words, objects, novels are meaningful only to the extent that they are symbols and subject to a semantics, i.e., a theory of meaning. This means that objects cease to be meaningful when we no longer know how to reason about them or how to use the symbols for them. There is a warehouse in Maryland that belongs to the Smithsonian Institution. It houses a collection of what we believe are clearly human made artifacts whose use we cannot figure out—here it is, what it does no one knows—those artifacts have lost their meaning—or more precisely, we have lost the ability to speak meaningfully about them.

But does the same case hold for knowledge? That is, can we use the same tactics we used on the notion of meaning to explain away the notion that artifacts embody human knowledge? This one is tougher. The difference is that we can watch a watchmaker—the old fashioned kind—make a watch. We can watch him select the gears (perhaps even make them) and fit them together with appropriate winding mechanisms—take it apart and redo it if the first effort doesn’t fit his fancy. We can observe his efforts to fit it in a case and test it for its time keeping accuracy. In this case we can clearly see the knowledge being put into the watch. Or can we? Aren’t we employing a similar interpretive scheme—inferring intentionality where they may be none? For the “skilled” watchmaker substitute a chimpanzee. I am sure you can picture a chimp sitting in front of several boxes of components, picking up one piece and cocking his

head while turning it around, then putting it down and picking up another piece and eventually assembling a watch. Or imagine a set of boxes of watch components on a shelf and a cat jumping up on the shelf and then knocking over one box after another as it tries to negotiate its way, spilling the contents on the table below, with the result being a watch! In this case you are unaware of how the watch was put together. This last case may appear far-fetched. Regardless, doesn't the same point hold? However the watch was constructed or put together, given the watch, we *infer* that there is something called knowledge in the thing—it isn't that the thing *has* knowledge in it somehow—rather, we infer that to be the case?

Let us return to the Maryland warehouse. Here we have loads of artifacts—"clearly" human made objects, of whose function we have no notion. As noted above, they have no meaning because we infer the meaning of an object and if we don't know what they are supposed to do, we can't import meaning to them.

What about knowledge—could knowledge be embedded in them? I think not. For to answer in the positive requires a host of assumptions to which we are not entitled. That it looks like a human made artifact does not mean it is one. Further, assume for a minute that it is a human made artifact—from the fact that a human made it, it doesn't follow that the human knew what it was doing when it did so. And if it did know what it was doing, didn't intentionally do action A to achieve result B, then in what sense does the machine have knowledge embedded in it? And, finally, consider the Rube Goldberg machines—marvelously entertaining devices that in our teleological world *do* nothing. They are the equivalent of a tinkerer putting parts together with no end in mind and no plan—just putting parts together—in what sense does that machine have human knowledge embedded in it?

Where does that leave us? There seems to be at least one sense in which we can say that an artifact embodies human knowledge—which was the case of our watching the watchmaker build a watch. But, then again we are only entitled to infer he knew what he was doing—and even that inference is restricted, for if he did what he did because he was merely trained to put part A in slot Z and he has no understanding of what he is doing, then the sense of knowledge begins to erode. On this approach objects do not embody knowledge. We infer that they do and sometimes we may be right.

Finally, let us return to our philosophical landscapes, plate tectonics, and a possible explanation of what this is all about in some sense of “all about”. The philosophical landscape has changed. The increasingly technological, i.e. human-made, features of our world are forcing us to ask some different questions. Some of these questions in turn arise from two things: (1) not recognizing the changing landscape and (2) from remaining immersed in the old way of thinking about things. If we accept the view that philosophical questions ought to be understood as historically contextualized, then the old way of thinking about *things* has some historical basis to which we should return, if only briefly. Here is a first stab at identifying that basis.⁷

Descartes (1637) created our current problem by making a mess of things when he introduced the mind/body distinction. He separated what he wanted us to think of as our essential being—our minds—from the peripherals like our bodies. The mind/body distinction gave Marx some philosophical license to describe the result of the relation between the man on the factory line and the objects with which he interacted in terms of alienation. That is, unlike the classical craftsman, whose labor could be seen as transformed into an object he could use to procure goods, the assembly line person never really gets the opportunity to identify with the product of his or her labor being involved with only one small part of the construction of an object. This point becomes instantiated into a permanent bifurcation between human beings and their world. Descartes set up the general formula and Marx gave it specific content.

However, just as there is an historical context for understanding our current state, there is an historical antidote. Hume (1739), in part reacting to Descartes, tried to set the philosophical discussion back on track but, for a variety of political reasons, he never got the hearing he deserved until now. In Books Two and Three of the *Treatise*, Hume lays out a thorough-going naturalism which places us back in the world and as part of it. We are not things that look at the world through odd lenses and think about it—we are fully engaged parts of the world, we cannot be alienated from our labor for it is what we are, things that we do. What we do may or may not be intentional. The meaning of what we do is what we say it is, and over time that will change, depending on our perspective, and when we are gone there will be no more meaning. Likewise for knowledge. To seek to place meaning and knowledge in things is to adhere to the Cartesian mistake of taking us out of the world. To see our objects as apart from us is to continue to buy into Marx’s view of the separateness of things and it represents a

philosophically bankrupt way of trying to correct the new problem of seeing how objects embody human knowledge.

Ironically the change in the landscape, which comes from a variety of factors, some of them the results of modern scientific research, is the reassertion of *homo faber* as the model for thinking about philosophical issues and the displacement of the Enlightenment ideal of reason. It also gives us the basis for rethinking our approach to the questions we raised earlier about knowledge and meaning.

The objections raised earlier were based on a contemporary analytic framework of sorts. But if philosophical landscapes change, maybe we are speaking from the bottom of the ocean and don't realize it. That is, if, contrary to the Cartesian/Marxist perspective, we are, in fact, *in* the world and part of it, as opposed to being commentators on what we see from some abstract point above it all, then maybe we need to rethink the status of human made objects. If it can be said of humans that they have knowledge, and the objects that humans make are, as we are, both in and of the world, then we might be able to talk about objects having knowledge in the same way that humans do. Or, to put it differently, maybe we need to rethink the category of human made object, i.e., artifact. At this point in time we proceed with an analysis of things as this or that and then try to figure out how what we know got poured into this or that. Instead, consider what would happen if we accept as a primitive category in the scheme we use to think about the world, the assumption that artifacts, *by virtue of being human made objects* embody, exemplify, human knowledge? If we start there, with the assumption that in fact this is the case, then the question of "how" disappears and other questions can come to the fore; questions such as "what is the process by which we create our objects so as to embody our knowledge?" And through an analysis of that product we may discover that the object was constructed by rote training. Does that mean that the object doesn't embody knowledge? No, it simply show us that while this person does not have the knowledge that the object embodies, the fact that what he constructs reliably works as it is advertised to means that someone had that knowledge and packed it in such a way that it could be passed on by training. To reconceptualize the issue by rejecting the Cartesian dualism and embracing a form of naturalism changes the philosophical landscape, as long as we actually reject the old and embrace the new. The new view takes human action and its product as primitive and concentrates on the processes by which goals, desires and values are transformed by those actions and products. Abstract, perennial questions and universal

answers are no longer, in this new configuration, the desiderata. Understanding the means by which we impact the world and how it impacts us is the new goal.

Let me briefly spell this out. The idea here is to concentrate on why people do what they do. Understanding the relationship between artifact and maker begins with the fact that the artifact was designed and constructed by human beings. To understand why that artifact was constructed when it was by who it was, one needs to look at the social, economic, political and cultural context. One also needs to consider the state of knowledge at the time, the capacities people had and the materials available to them. Look at it this way: why didn't Leonardo da Vinci build the submarine he sketched? He didn't have the relevant knowledge, materials and financial resources, among other reasons. He also didn't have a suitable patron, nor could he demonstrate the practical value. Why haven't we established a permanent base on the Moon? There are economic, geo-political as well as internal political reasons. We probably can do it, meaning by that we have the knowledge, the material resources and capacity. Understanding why we build what we do is a complicated business and it means we have to look many factors. But in so doing we essentially see the object in its context as a product of human activity based on knowledge, skill, use of materials, etc. It further means what we understand as knowledge as knowledge will be contextualized.

Philosophy has changed, thanks to philosophers of technology, and that is good. We should stop trying to fit this very good new wine into old chipped and cracked bottles. It is time we gathered at the mountain top, looked around, and appreciated the new landscape.

References

- Bachelard, Gaston. *The Philosophy of No*. 1937.
- Baird, Davis. *Thing Knowledge* Berkeley: University of California Press, forthcoming.
- Daston, Lorraine. *Introduction to Biographies of Scientific Objects*. Chicago: University of Chicago Press, 2000.
- Descartes, Rene. *Meditations on First Philosophy*, translated by Crewe, Indianapolis: Hackett Publishing, 1637.
- Hacking, Ian. *Representing and Intervening*. Cambridge: Cambridge University Press, 1981.

Hacking, Ian. "Historical Meta-Epistemology" in *Wahrheit und Geschichte*, edited by W. Carl and L. Daston, Goerttingen, 1999.

Hume, David. *A Treatise on Human Nature*. Oxford, Oxford University Press, 1739.

Galison, Peter, *Image and Logic*. Chicago: University of Chicago Press, 1998.

Shapere, Dudley. "The Character of Scientific Change" in *Scientific Discovery, Logic, and Rationality, Vol. 1*, edited by T. Nickles, Dordrecht: D. Reidel, 1980.

Notes

¹ I am clearly not the first person to note the changing face of philosophy. A number of others have addressed the topic, such as Dudley Shapere (1980), Ian Hacking (1999) and Lorraine Daston (2000). I thank an anonymous referee for this journal for that reminder.

² Thus, when we ask "What is the Good Life", the appearance is of the same question Socrates asked. But, by virtue of the fact that the answer that would have satisfied Socrates would not satisfy us shows that, in a fundamental way, the same question has not been asked. Likewise, the answer that would satisfy us, if we only knew it, most certainly would not satisfy Socrates.

³ It may be a mark of the immaturity of the philosophy of technology as a field that what it is remains a topic of debate.

⁴ For further elaboration of this dual nature of technological artifacts see the Dual Nature Project at the Technical University of Delft, Netherlands.

⁵ An anonymous referee has challenged this idea, citing the pyramids of Egypt. We could also look at Imperial Rome, etc. I am not suggesting that large dominating technological artifacts have not existed before the current era. The idea here refers to the complexity and the number of complex technologically based systems, e.g., the internet, international airplane infrastructures (airports, manufacturing, international agreements on routes, etc.) international commerce, interstates highway systems, railroads, and the list goes on and on.

⁶ Another anonymous referee had a series of objections to the use of the "embed" in this context and rightly so. However, I am not proposing or defending the idea. Rather, the issue is what I am after, not a defense of a word. The issue, I take it, is new and demands an answer.

⁷ Clearly what follows is at best a potted history of an idea. However, I am convinced that with some work it can be filled out and elaborated. What I fear is that it will look a like Heidegger's view, but perhaps without the gloomy conclusion.