Chapter 11: Animals in Philosophy of Technology

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Introduction

Technology is typically discussed as a human-only phenomena. In discussions of technology, historians, sociologists, philosophers, and other storytellers often take as their starting points either the dawn of human civilization, the industrial revolution, or the computer age. They set chronological limits on the domain of inquiry about technology, trying to make sense of the promises and perils of today's technological milieu. Oftentimes, philosophers of technology focus on modern engineering practice and proliferation, analyzing technology through a contemporary engineering frame.

Definitions of technology reflect this frame. Historians Mevlin Kranzberg and Carroll Pursell define technology as "man's effort to cope with his physical environment . . . and his attempts to subdue or control that environment by means of his imagination and ingenuity" (1967). Forbes writes that "[t]echnology is as old as man himself " (1964). Leinhard explains that, "[t]echnology has driven our brains . . . [and] has, in turn, expanded our minds and fed itself " (2003). Joseph C. Pitt defines it as "humanity at work" (2000), while Thomas P. Hughes sees it as "a creative process involving human ingenuity" (2004). But, Keekok Lee writes that "technology—in the general sense of the manipulation of nature to suit human purposes—is not peculiar to modernity" (2009).

All of these definitions, and many others, associate technology with humanity. "Technology made the man, and man made the technologies," in the words of Kranzberg and Pursell (1967). In this way, philosophers of technology have neglected animal research and creation. The last thirty years of animal research suggest that the sorts of hallmarks we closely relate to human invention can also be found within the wider animal kingdom: researchers have found evidence for great intelligence, design, innovation, material cultures, causal reasoning, and the use of metatools among other species.

The past thirty years of animal research has shown tool use and construction are much more widespread and complex than has been appreciated by philosophers. New insights in animal science provide better grounding for philosophers of technology to take up questions about the nature of tools and technology, the role tools serve in the lifeworlds of their users, the roles of animals in our thinking about human beings, and more. Animal studies provide a fresh perspective that might bring balance to what is right now a very engineering-focused discipline, and an appreciation of animal studies within the discipline might lead to wider audiences and concerns.

While studies of engineering remain a staple of interest in philosophy of technology, animal studies deserves more investigation, for animals make and use things too; they are also, in the age of big biotechnology, the first groups of participants in our trials. Our environmental disasters that come from our technological hegemony impact animal survival, diversity, and life. Moral philosophy has already taken up the cause of animals, with the ethics of animal consumption, their use by science, and conditions of their lives scrutinized (Beckoff 1972; Singer 1972). Philosophers of technology provide a different approach by looking at how tool use varies, the conditions under which creatures construct objects, and how techniques evolve, as well as more

traditional questions about the relationship between humans and nonhumans, the defining features of technology (vs. tool use), and the use of animals as technologies. **This chapter argues that we need to consider animal cases and suggests how that might be accomplished.**

Many philosophers of technology take as their starting point the industrial revolution or the invention of the steam engine to mark off modern technology from premodern (Borgmann 2009; Heidegger 2010). I would argue that there is no easy dividing line, and that, if we are to investigate the meaning and importance of technology, writ large, looking at animal cases ought to be focal in any philosophy of technology. Not just a contrast class, animal studies provide insights into our embodiedness, our evolution as tool users, and our relationships to other creatures, as well as notions like creativity, invention, technological knowledge, and innovation. Neglecting the animality of our human enterprises no longer seems reasonable, given the state of animal research and given the importance of technology in our lives. To ask ontological, phenomenological, epistemological, and ethical questions about technology requires consideration of the meaning and evolution of tool use to technology.

Themes and Motivations

Breaking free of the cultural underpinnings to our understandings of animals requires much work. Oftentimes, through biblical and other cultural mythologies, nonhuman animals get situated as inferior to humans, as in need of good stewards in humans, and as lesser in important human capacities. In Plato's tripartite theory of the soul, it is only humans who possess all three parts: logical, spirited, and appetitive; Aristotle also sets humans apart from nonhuman animals, who supposedly lack the capacity for reason that humans have. This idea that humans (and particularly male humans) are rational, while animals (and sometimes women) are not rational dominates much of our history. In biblical stories, we witness Noah saving all the animal species that exist by loading them, two-by-two, onto his ark (Genesis 7:9); stewardship and care becomes the frame through which to view nonhumans. Through this dominant cultural lens, the evaluation of animal intelligence and capacity was understood such that many of the things animals make and do—from nest building to hunting—get reduced to mere instinct instead of indicating learning, intelligence, or creativity. Add to this the paradigm of behaviorism directing all understanding of mind by the 1950s, where input-output machines become the metaphor for animal life, and we've set ourselves up for misunderstanding, preconceived notions, and bad science and philosophy.

Donna Haraway highlights that bad science in her Primate Visions (1989), and later introduces the notion of the cyborg to slip out of these narratives, to liberate women (and animals) from these hegemonic frames (Haraway 1991). Peter Singer and Mark Beckoff have worked to ameliorate the horrible idea, which comes from our cultural mythologies, that animals either don't suffer or that their suffering doesn't matter (Singer 1972; Beckoff 1972). In moral philosophy, we see the most robust treatment of animals within the philosophical literature. Peter Singer's Animal Liberation (1972) was a utilitarian-ethics-based call to end animal suffering.

By counting animal suffering as real and important to our moral evaluations, he elevates animals for consideration within moral theory. Mark Beckoff has stressed the same: animal suffering is of significant moral consequence. Working from a deontological frame, Onora O'Neill has integrated animal concerns as well (O'Neill 1997). The idea that animals must be factored in ethical considerations has had an impact on bioethics, the treatment of laboratory animals for research, and our continued use of animals for meat and subservience to humans. They have effectively argued that animals matter in ethics, though they might disagree on the specific details of those theories.

The emergence of philosophy of biology as an important branch of science for philosophical consideration means that there is now ample work on evolutionary mechanisms, language, and methodology that involves animal subjects (Dawkins 1999; Millikan 1984; Burian 1978).

Despite increasing sophistication in animal theory and differentiation between species and cognitive properties, philosophy of technology has not used animal cases in a rich way. Those scholars working on AI, philosophy of mind, and biotechnology sometimes analogize to animal cognition or construction, using animal cases as proof that something is possible or inevitable when it comes to engineered intelligence (Dennett 1995a; Dennet 1995b; Searle 1998). Thomas Nagel, in "What is it like to be a bat?" explores how we might explore animal thoughts and the difficulties in that process (Nagel 1974).

In terms of ethics for emerging technology and modern life, Paul Thompson employs animal cases to discuss the difficult decisions that lie ahead in the treatment of farmed animals, given the rise of genetic engineering (Thompson 2013). Diane Michelfelder has considered nonhuman animals in the context of cities (Michelfelder 2003).

Philosophers of technology have sometimes made reference to animal cases, but not in a rich way outside of their use in ethics, and otherwise still often taking animals as the sort of input-output machines seen in behavioristic theory. Insisting on the difference between human and animal artifacts, Davis Baird writes that spider webs "are well adapted to catch flies . . . there is no connection established between this approach to catching spider food and other possible and actual approaches" (2004: 141). By using this case, he dismisses a whole class of potential knowledge-bearing constructions, the subject of Baird's work. The use of the example of the spider serves to underappreciate those objects constructed by animals that do demonstrate sophistication, like the use of a set of tools and shaping techniques by New Caledonian crows (Hunt and Gray 2004) or the material culture of different groups of chimpanzees (Sanz and Morgan 2007).

Similarly, Joseph C. Pitt defines technology as "humanity at work" (2000), but leaves room that the definition might some day include "the activity of beavers or alien" if we develop a good sense of what constitutes "purposeful activity for non-humans" (2000: 11). I think new animal research indicates that we have some sense of work on the part of other species as being more than what mechanistic or behavioristic models would lead us to believe. Important work has been done by Mieke Boon about how we care for other creatures (2005), and this is a start in considering how we use animals in technological contexts. What I suggest here is that we need to engage with animal studies on several levels, including this one.

Objections

Animal cases belong in any study of epistemology or intentionality with regard to the use of technologies. The things nonhuman animals construct are worth our consideration, especially if we hope to develop rich understandings of how and why our technologies take the forms they do today. More than just satisfying needs or desires, the ways in which different groups use tools differently, pass on tool-making practices, or fail to use tools, provides for enriching discourse about the trade-offs in technology adoption and use, as well as an understanding of function and form suited to particular tasks. I think here of studies of the tool use of crows and rooks (Hunt and Gray 2002; Weir et al. 2002; Taylor et al. 2007; Bird and Emery 2009), of dolphin techniques and specialization (Krutzen et al. 2005; Sargeant, Mann, Berggren, and Krutzen 2005; Gazda et al. 2005; Pryor and Norris 1991; Janik et al. 2006), and of primate behavior and tool use (Goodall 1986; Sanz and Morgan 2007; Toth and Schick 1993; Inoue-Nakacura and Matasuzawa 1997; Osvath and Osvath 2008; Boesch and Boesch 1989; Visalberghi et al. 1995). These cases provide rich fodder for thinking about how techniques are communicated, how practices with tool use are culturally variant, and how knowledge about objects is made and transmitted. In exploring cases of animal tool use and construction, I've encountered many objections to the inclusion of animal cases in discussions of epistemology of technology (although I suspect these objections would also be targeted in using animal cases in other areas). Here are the four main objections to their integration and replies to each.

Objection 1: “You’re Just Anthropomorphizing”

Anthromorphization is inappropriately mapping human characteristics onto animals. The force behind this objection is that, in fact, in studies of things like cognition, tool making, and reason, one does indeed map human concepts onto animal behavior. These are concepts we consider important to humanity, to how we define ourselves as a species, but so much of this is bound up with cultural narratives about what humans do and think vs. what animals do and think. However, not mapping these concepts on, when appropriate, is also problematic. Ted Kerasote writes:

> [a]nthropomorphization is often maligned for ascribing human characteristics to animals who can’t possibly know what we know. And there is some truth to this. I doubt [my dog] thought of the Big Bang when he gazed at the starry heaven. But the reverse—not ascribing volition to creatures who repeatedly display it—is also inaccurate. It leads to what poor translation always does: misunderstanding between cultures.
> (Kerasote 2008: 112)

To not project our concepts onto some of the ways in which animals behave presents a problem—and, by not using some of our concepts, we actually impoverish our own worldviews. The idea that animals couldn’t suffer or feel pain in the way humans do helped justify neglect and mistreatment of animals; while moral philosophy has taken up the case of animal suffering (they suffer as we do), philosophers would also do well to take up the idea that many animals demonstrate remarkable intelligence, problem solving, and cognitive function. While it may not always be ‘like us,’ and accepting that proving these things are difficult to demonstrate, scholars and researchers should project and maintain that some of the things nonhuman animals think and feel are parallel to the things that humans do.

Objection 2:“We Need to Understand Humans First”

While some philosophers are friendly to accepting animal cases as important and related to what humans do, they still push for looking solely at human invention in our technological studies. Similar for justifications that pare philosophy of technology down to just looking at engineering cases, these scholars argue that we know for sure that humans use technologies and tools in a sophisticated way, while we cannot be sure of what is going on with animals. (The engineering analogue is: we can’t be sure that every material product fits into the category of ‘technology,’ but we know the products of engineering do.) The thinking goes that, to investigate the nature of technology, we need to set a domain of discourse, and animal products are unclear in this regard.

However, if we truly wish to investigate the nature of technology, whatever we mean by that, looking at the challenging and border cases would actually help enrich a study and give clear guides. In my own scholarship, I’ve discussed how beavers building dams provide less clear intentional behavior than, say, bowerbirds do in constructing their nests or New Caledonian crows do in the making of their tools (Shew 2007; Shew 2008). By taking into account a greater spectrum of activity, we can appreciate nuance and provide more clarity in terms of the origins of technology and tool use as activities. I would argue that any epistemology or ontology of technology needs reference to the evolutionary and social processes by which technologies are created, maintained, and distributed.

Objection 3: “We Can’t Possibly Understand Animal Cognition”

We can’t understand animal cognition, but it’s fair to infer certain processes, like the ability to plan and shape and think abstractedly, when animal studies are carefully done and defined. Appreciating that other animals do think and make and communicate is as important to recognizing that other humans do too. Just because those cognitive powers manifest differently does not mean that they aren’t there. For too long, humans have taken animal cases as trivial and have taken animal minds as insufficient and inferior. To continue assuming that we should bracket off human behavior as special while not investigating the wider spectrum of behaviors

and minds seems absurd. Surely, nonhumans are not directed or conditioned for the things humans are, but that doesn't make their work or lives outside the sphere of technological study.

Mike Hansell provides wonderful accounts of animal construction. One of his chapters illustrates something so important to remember: "Tools Aren't Always Useful" (Hansell 2007). It's funny that we take tool use and construction to be of utmost important and the clearest indicator of intelligence when, for most animal species, carrying an extra something around with them actually confers a disadvantage to survival. There are plenty of smart species out there that have developed no tool-using behaviors—and that indicates more about the ecological niche that they inhabit than it does the function of their minds. There have been some amazing studies comparing the tool-use of rooks to New Caledonian crows. New Caledonian crows use a dizzying array of tools in the wild, and tests in captivity have shown that rooks, who make no tools in the wild, are just as adept at problem solving and making tools when put through the same tests (Bird and Emery 2009). While tool use won't always indicate animal cognition, the material products and capacities for manipulation of objects can provide a good study in how (and in what niches) tool use can arise; this can lend itself to a better understanding of the evolutionary mechanisms at work in the rise of homo sapiens (man the knower) as homo faber (man the maker).

We assume that other humans think like we do; we make inferences about other human cognition all the time. Assuming the same about some animals, especially given the sophistication of research on animal intelligence, seems to be less problematic than assuming that our lack of understanding about cognition in general should keep us from using animal cases, especially when our interest involves material production (something you can hold without probing into another's mind).

Objection 4: "Animals Have No Concept of Technology, Therefore We Shouldn't Project It Onto Their Activities"

I have three replies to this objection. We humans have made the classification system and developed the concepts, but that doesn't mean they cannot be applied elsewhere. First, we do this all the time with technology. We classify plenty of things from the recent and distant past as 'technology'—the wheel, swords, trebuchets, and buggy whips—when the people who once used and made those things did not use the word or contemporary category of 'technology' in the way we do now. We don't generally consider this a problem; we talk about the history of technology, referring to the whole of made objects, without contradiction or irrelevance. (The problems generally arise when we assume everyone thought like us or that our categories are real and unmovable, instead of convenient ideas for which to categorize things.)

Second, being able to understand a category isn't a requirement for doing something within that category. Marginal cases bear this out: a baby can roll over and scoot and crawl, for instance, without knowing the category or the name of those actions. Knowing what you are doing is not a necessary condition for doing it.

Third, there's also a precedent, not only in discussions of technology, but also in other academic work for determining a group of ideas to better make sense of how people did things in the past. Jessica Riskin, in Science & the Age of Sensibility (2002), uses the concept of "sentimental empiricism" to trace an intellectual history of the French enlightenment. Though this is not a term adopted by the thinkers she discusses, the idea she introduces helps to explain the literature she tracks, demonstrating how modern science developed from these once-seemingly conflicting concepts of reason and sensibility. The concepts we use are supposed to help us explain things, whether or not the actions or constructions we hope to explain use those same categories or not. Crows could still shape twigs, and spiders could still spin webs, and dolphins could still use signature vocal tunes without those concepts existing in human minds.[1] Importing our concepts onto their activities is in no way a problem as long as we don't also assume that they share all of our categories.

Agenda

By now you are convinced that animal cases can be incorporated, but why should you use them? Scholarly conversations about technology take many forms, from reflection about Big Technology to intellectual property and nanotechnology. Animal cases won't always make sense. However, in the sort of core issues that pop up in topics in the subject, animal cases can be integrated. Aside from bioethics (which has already integrated concerns about animals), core topics include the topics that the discipline of philosophy of technology grew up around: the transmission and nature of technological knowledge, the role of skill and tacit knowledge, the differences between science and technology (science being a very particular cultural practice), the nature of humanity in the face of technology (where animal cases might provide relief), and the defining features and nature of technology itself. Some of this has been taken up in AI literature (in making sense of intelligence), but there is much left to do, especially in amending fundamental concepts and disputes in philosophy of technology to make use of these cases.

Animal research has demonstrated that humans are not the only makers-of-things; it has also shown tool use (and systems of tool use and technique) to be situated in environmental niches and cultural contexts. Continuing to ignore these cases and solely turn to engineering for guidance about the nature, transmission, and importance of technology in our lives no longer remains feasible if we wish to engage in broader reflection about technology.

Additionally, doing the kind of scholarship I suggest—with rich incorporation and appreciation of animal cases—speaks to and incorporates larger communities of researchers who wish to engage on broad questions about intelligence, intentionality, creativity, innovation, material culture, and social contexts. Philosophy of technology is uniquely situated to take up questions about these things, with a rich set of cases from engineering already at hand; by contrasting those cases with a broader set, philosophy of technology's relevance becomes clearer. Philosophy of technology is, arguably, the most important area in philosophy, whether or not philosophers in general recognize that. Reflections about technologies—indeed, about how our lives are framed and understood—help do exactly what Wilfred Sellars suggested was the definition of philosophy: "The aim of philosophy, abstractly formulated, is to understand how things in the broadest possible sense of the term hang together in the broadest possible sense of the term" (1963). Making sense of how things "hang together" involves looking at more things, and philosophy of technology already has the frames for investigation ready to fan out onto animal cases.

Note

1 There's actually evidence that dolphins can understand abstract categories. Some search and rescue dolphins in captivity are able to go searching underwater for man-made objects with a particular size range with instructions that point to this vague category of stuff (Pryor and Norris 1991); there's also evidence that dolphins have signature vocal tunes and something like naming (Janik et al. 2000 Janik et al. 2006). It's not clear that dolphins can't have the concepts we are using in their practice.

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