

Symposium on the History of Technology: Past, Present, and Future

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The History of Technology in an Age of Mass Extinction

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At the age of 65, I've been coming to terms with what my own responsibilities are as an historian in an age of mass extinction. It weighs upon me, partly because I've come to it so late. I've never published on the topic, though I'm preparing to, but over the past few years I found myself incorporating non-human animals more and more into my lectures, so much so that, starting this year, I'm converting my history of technology class into a history of human-animal relations, though with of course a lot of science and technology.

I live and work in the middle of one of the world's largest rainforests, Southeast Asia, whose non-human inhabitants are being systematically led to extinction. But of course it's a global crisis. The photo to the right is of a dead North Atlantic right whale entangled in Canadian fishing lines,



but they could just as well be lobster trap lines from my native state of Maine. I'd like to see historians of technology take the matter more seriously than we have, starting with myself. Some of

my grant collaborators are conservation biologists who take the matter seriously indeed and don't believe they have enough allies among humanity scholars and social scientists, most of whom remain far more concerned with human animals, and seem content to leave non-human animals to people who study them 'in nature' or 'in the field'. The idea that this divide has been breached in the academy is still a polite fiction, though I give due credit to minority of my colleagues who've taken the leap.

My interests actually extend beyond mass extinction to the way we treat other sentient beings more generally, and by treating, I mean, for today's talk, how they figure in our research and teaching and whether it's with the intention of somehow making a difference to current and future animal life. Whether we write with a sense of empathy and purpose and, as Martha Nussbaum would have it, justice, I'm here to argue that the history of technology should not stand outside of or be indifferent to what Nussbaum calls our collective responsibility.¹

There's already been a limited turn toward non-human animals even in our field. In 2001, Edmund Russell posed the question on a LISTSERV, "Are animals technology?" Martin Reuss answered, "My two cats are not technology, but they've certainly been affected by it."² I think that's about right. Every sentient being is affected by it. This LISTSERV discussion is said to have been a seminal moment in turning the attention of our field to other species, though it took another 22 years for *Technology and Culture* to publish a special issue about animals, in this case, cows.³

And it is a very good special issue. I do recommend it. In the interim, lots of historians have published books with animals at the center, particularly those who fulfill human purposes.⁴ And all of this is to be commended. But when it comes to wild animals, the literature gets much thinner. Despite the larger turn toward the environment in our field, many accounts still leave non-human animals out of the picture or as incidental components of ecosystems.



One exception is *Wired Wilderness* by Etienne Benson, a graduate of this very program at MIT, who is arguably the first and, unfortunately, one of the last historians of technology to delve, at book length, into the human-wild animal relationship. Set primarily in the U.S., with one chapter detailing an American mission to Nepal, the book is a good opening to a vast topic, which could fill dozens of PhD dissertations.⁵

Another example, from my own part of the world, is *Mao's Bestiary: Medicinal Animals and Modern China* by my former student, Liz Chee, for which we have Mike Fischer to thank for sponsoring it as part of his Duke University book series. The book is a good model of a history intending to inform change in the present. Liz showed that, despite wild animal medicines being marketed as traditional in China, their varieties, their proclaimed curative powers, and their availability exponentially increased under the early communist regime and has been increasing ever since.⁶

The process she calls faunal medicalization is the most profitable component of TCM, which itself has evolved into what the anthropologists Pordie and Hardin call "Asian industrial medicines with global reach."⁷ One foci of Liz' book is the bear bile industry, which involves capturing wild bears and inserting a



permanent tap into their gallbladders. They're then kept in woefully small cages and regularly milked for their bile. The bear in this photo is wearing a metal girdle to keep the catheter in place. It's an amazingly cruel practice, but highly profitable. Yet it's hardly traditional, nor even Chinese, originally. Liz traced its invention to North Korea, from which it was introduced to China in the 1980s, where it became a new industry under Deng Xiaoping's reforms.

Following on Liz's work, my own research group is delving deeper into the enmeshment of non-human animals in Chinese pharmaceuticals. For example, we're tracking down every reference in the so-called Bible of Chinese animal medicine, a three-volume work written by the man in the center of the photograph, Gao Shixian, starting in the 1970s. The author himself describes the work as showcasing, "new knowledge, new discoveries, new technologies, new methods, new viewpoints, new situations, new conclusions, and new achievements," and not, incidentally, many new animals.⁸ This illustrates how



faunal medicalization is hardly just a vestige of traditional beliefs or uses and, in fact, remains a threat to increasing numbers of species on a global basis.

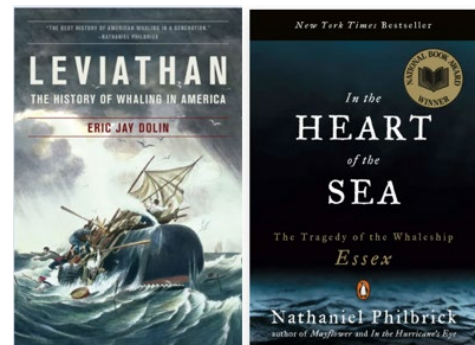
The consumption of wild animals by medical industrial systems is hardly confined to Asia, however. It's also only slightly less visibly embedded in biomedicine. We like to think, for instance, that the 70,000 monkeys used annually for medical research in the United States are bred for that purpose, like the mice in Jackson Lab. But as Jan Creamer has pointed out, due to the failure of captive breeding, they are continuously taken from the wild, like this macaque and her child in Mauritius, or the thousands imported into the United States from Cambodia, and this despite the fact that the macaque is an endangered species.⁹



A full history of what's been done to lab animals, how it was done, what was gained, what wasn't worth the gain, would be a worthwhile project for our field, not something we need to leave to historians of medicine or science. There's so much technology involved. Such a study would likely conclude that the vast majority of animals killed and maimed produce no publishable results, and in other cases, inconsequential ones. Jane Goodall and 380 other wildlife biologists have recently called out experiments by Margaret Livingston at the Harvard Medical School, for example, as not only inhumane but of dubious scientific value. That's what all that thrown glitter was about at the most recent Harvard graduation ceremony.

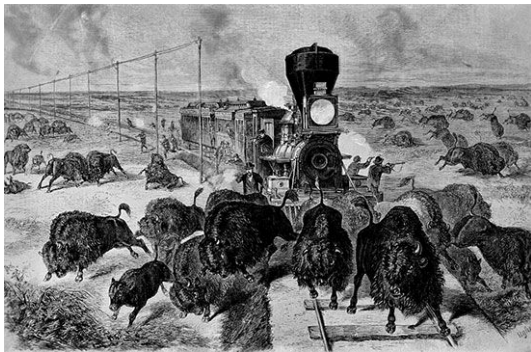
But to return to whales, no animal was sacrificed more to nineteenth century American technology, from lighting lamps to greasing the leather belts that ran all of that textile machinery. I was surprised to discover, in preparing for this talk, that, in the twenty-first century, heroic man versus whale histories are still so numerous and sell so well, even winning national book prizes. *The Heart of the Sea* by Nathaniel Philbrick chronicles the one

time that a whale actually sank a whaling ship. Yet it presents that incident as a “tragedy” rather than a celebration. We historians of technology seem to have abandoned the whale and whaling, however, thus providing no antidote to that literature, no histories that portray it as the far-from-heroic bloody



business of slaughter it always was – and not incidentally remains in the case of Japan and Norway, with no discernible purpose other than national pride.

It's not that excellent books aren't being written. They are, like Richard Ellis's *The Empty Ocean*, but they're generally by social and biological scientists or science journalists who generally have limited time to devote to archival research or to tell a *longue duree* story.¹⁰



Most of what I've talked about so far can be classed under the title "defaunation." We hear a lot about deforestation and habitat loss as a major driver to extinction, which it is, but animals - or just their horns, in the case of dead rhinos like this one - are also being sucked out of otherwise intact environments and then commodified as medicines, pets, and food. This has an equally devastating effect on target species. The illegal international wildlife trade is estimated to be more profitable and certainly safer for those engaged in it than the illegal drug trade or the illegal arms trade, though they're often run by the same networks. And though these issues are accelerating in the current

century, they all have excavatable roots and precedents from beaver to bison to the Japanese wolf.¹¹

I know our instinct is to look away from a lot of this, which is why it's important that we don't. It's particularly difficult when it involves our lunch or our dinner. I myself went through a trajectory on how I handled certain materials in the classroom. For years, I started my lectures on Fordism, as many of us do, with the nineteenth century disassembly lines in Chicago and Cincinnati, but then I'd quickly move on to automobiles. After a while, however, I decided animal slaughter shouldn't simply be a footnote to the history of cars. Otherwise, we're just following the script that Henry Ford gave us in his autobiography. So I started coming back to the disassembly line and discovered all sorts of technological systems, every bit as sophisticated as a car plant but more disturbing in their denaturalization of living beings. I hesitated, at first, to show these videos to students, expecting blowback. Then I just decided they needed to know where their food comes from, and now I even show them what happens to all the male chicks who are machinated minutes

after they're born, billions of them a year, regardless of the words "free range" written on all of our egg packaging.



This clip generates the most feedback of any I show. Many students tell me they imagine themselves as these chicks, existing in the few moments they have between birth and death within a mechanism that handles them as inanimate objects. This isn't a PETA video, by the way, but a promotional film made by the

industry itself to show its efficiency. It's accompanied by a lively, upbeat soundtrack of rave dance music.¹²

Starting next semester, my assembly line lectures is going to be only incidentally about cars and mostly about living things, a million little Charlie Chaplins winding their way through technologies which are as anonymous as they are. Chicks in this video are being separated by sex, the males for death and the females for processing on factory farms.

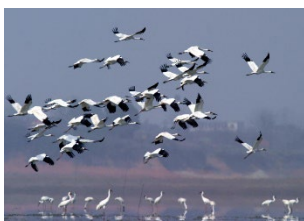
For eleven years, I've also been a consultant to the International Atomic Energy Agency, involved in bringing an STS perspective to the ongoing situation in Fukushima. In that role, I've become interested in the effects of low-level radiation on animals. The incidents at Chernobyl and Fukushima have been the subject of many histories, both popular and academic, which bring together technology, disaster studies, and medicine, among many other categories, but what's usually left out is the effect of the radiation release on wild animal populations, possibly because it doesn't fit the narrative of a disaster.

Despite predictions to the contrary, animals thrive in both irradiated zones with stable, healthy populations and few signs of genetic mutation. That may be partly because they don't live long enough to develop the sort of cancers that we would with our unusually long lifespans. They die of other things animals normally die of. But the great success of animals



within the evacuation zone seems to demonstrate that it's human presence, not radiation, which is their enemy. You could even say that we're being specieist in writing about Chernobyl and Fukushima as unmitigable disasters. They were for us, but not for them. It's raised the question among colleagues and myself, actually, whether we should even purposely irradiate all wildlife reserves as a conservation mechanism.

Actually, you can take almost any common topic or theme in the history of technology, and re-narrate it from the standpoint of affected species: oil spills from the perspective of seabirds, for example, or light pollution from the standpoint of terrestrial nocturnal animals, or even an animal-centric history of the interstate highway system. There's actually a branch of science called road ecology that studies how roads and highways impact local ecosystems.



Properly accounting for animals doesn't always require even centering them, but just noticing them. My friend Chris Courtney, in his award-winning book on the 1931 Yangzi River flood, was careful to note that, when the levees broke, humans and their domesticated animals suffered, but riverine birds flourished, as they had for centuries whenever the floodplains expanded.¹³ The book is richer for that inclusion.

We also need more accounts of habitat-compromising projects that never happened, such as the work Jonathan Galka is doing on deep-sea mining, a failed project of the 1960s but one which threatens to restart here in the 2020s with potentially devastating effects on marine life. Basically, they're sucking up the entire bottom of the ocean to get valuable minerals in the form of nodules. Galka approaches the history of technology through a longstanding interest in snails, harnessing his

sense of the fragility of animal life into an ethically-informed critical history that's also about the immediate future.¹⁴

I want to end with a subtitle of another brilliant book by Emma Marris, which reads, "What We Owe Animals in a Changing World."¹⁵ The minimum we owe them, I'd argue, is to tell their stories, and not treat them as occasional side-actors. In fact, I think our field has a particular burden or debt in that regard. It's precisely human technology that's been used to control, hunt, capture, terrify, enslave, and eradicate animals for millennia and is doing so now at an ever-increasing rate. Non-human animals have had as intimate a relationship with our technology as we have. So, if the question is, what is the worthwhile future direction for the history of technology, my answer would be to make that more apparent.

¹ Martha Nussbaum, *Justice for Animals: Our Collective Responsibility* (New York: Simon and Schuster, 2024)

² Are Animals Technology? <https://www.envirotechhistory.org/2001/08/01/are-animals-technology/>

³ Novick, Tamar. "Introducing Bovine Regimes: When Animals Become Technologies." *Technology and Culture*, vol. 64 no. 4, 2023, p. 1027-1043. *Project MUSE*, : <https://dx.doi.org/10.1353/tech.2023.a910993>.

⁴ Some recent ones I would note, in no particular order are: Edmund Russell, *Greyhound Nation: A Co-Evolutionary History of England, 1200-1900* (Cambridge UK: Cambridge U. Press, 2017); Neal A. Knapp, *Making Machines of Animals: The International Livestock Exposition* (Baltimore: Johns Hopkins U. Press, 2023); Thomas Fleischman, *Communist Pigs: An Animal History of East Germany's Rise and Fall* (Seattle: U. of Washington Press, 2022); Ann Norton Greene, *Horses at Work: Harnessing Power in Industrial America* (Cambridge, Mass: Harvard U. Press, 2008); Clay McShane and Joel Tarr, *The Horse in the City: Living Machines in the Nineteenth Century* (Baltimore: Johns Hopkins U. Press, 2007); Frederick L. Brown, *The City is More than Human: An Animal History of Seattle* (Seattle: U. of Washington Press, 2019); Peter Mitchell, *The Donkey in Human History: An Archeological Perspective* (Oxford: Oxford U. Press, 2018); Peter Akins, ed., *Animal Cities: Beastly Urban Histories* (NY: Routledge, 2012); Clemens Wischermann, Aline Steinbrecher, and Phillip Howell, eds., *Animal History in the Modern City: Exploring Limnality* (London: Bloomsbury, 2019).

⁵⁵ Etienne Benson, *Wired Wilderness: Technologies of Tracking and the Making of Modern Wildlife* (Baltimore: Johns Hopkins U. Press, 2010)

⁶ Liz P.Y. Chee, *Mao's Bestiary: Medicinal Animals and Modern China* (Durham, NC: Duke U. Press, 2021)

⁷ Laurent Pordie and Anita Hardon, "Drug's Stories and Itineraries: The Making of Asian Industrial Medicine" *Anthropology and Medicine*, Mar. 2015,22(1):1-6

⁸ Gao Shixian, *Chronicles of Chinese Medicinal Animals* (3 v.) (Tianjin Science and Technology Press, 1979)

⁹ <https://jancreamer.com/2014/02/14/brutality-of-lab-monkey-supply-exposed/>

¹⁰ Richard Ellis, *The Empty Ocean* (Washington: Island Press, 2003)

¹¹ Brett Walker, *The Lost Wolves of Japan* (Seattle: U. of Washington Press, 2005)

¹² See How This Machine Removes Chicken From Eggs In Seconds, Efficient Manufacturing Process 2021 <https://www.youtube.com/watch?v=ckr7zT0FMi8>

Accessed Dec. 1, 2024

¹³ Chis Courtney. *The Nature of Disaster in China: The 1932 Yangzi River Flood* (Cambridge, UK: Cambridge U. Press, 2018)

¹⁴ Jonathan Galka, "Bohemia at the Pacific Seabed: Archiving the Future of Deep-Sea Mining with the Interoceanmetal Joint Organization." *Social Studies of Science* (OnlineFirst).

¹⁵ Emma Marris, *Wild Souls: What We Owe Animals in a Changing World* (London: Bloomsbury, 1923)