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Living with Transgenic Animals

At research institutions and breeding companies around the world, perfectly healthy animals who were bred or obtained for research are routinely killed when they are no longer needed (Animal Procedures Committee 18, 39-56; Herzog 222-223; Laboratory Animal Science Association, *The Production and Disposition*; Ormandy, Schuppli, and Weary; Taylor et al.). Some of these surplus laboratory animals, as they are often called, are still healthy despite having been used for breeding or research, and others were never even used at all. In fact, some animals are deemed to be surplus stock shortly after they are born; they are the unwanted byproducts of efforts to breed animals with particular traits. Take genetically engineered (or transgenic) animals. In recent years, the increased demand for transgenic animals, particularly mice, has become a major contributor to the production of surplus laboratory animals worldwide (Ormandy et al.). As Hal Herzog explains, the typical methods used to generate lines of transgenic mice have efficiency rates ranging from 1-30%, meaning that “sometimes only one [mouse] in a hundred can be used for research” (223) “The other ninety-nine will be killed when they are a few weeks old,” Herzog reports (223). “They are the junk mice, collateral damage” (Herzog 223; see also Holmberg).

Although death is the “[d]efault [o]ption” for most surplus laboratory animals (Carbone, “Euthanasia” 160), not all of them are killed. Laboratory workers have been known to keep surplus animals as “laboratory pets” and to adopt them and take them home (Arluke 107; see also Birke, Arluke, and Michael 104-106). And a number of universities, biomedical companies, and other research institutions have developed more formal laboratory animal adoption programs (Carbone, “Adoption”; Carbone, Guanzini, and McDonald; Laboratory Animal Science Association, *LASA Guidance*; Wyrick). Some of the animals in these programs are adopted as companions, and others are transferred to sanctuaries where they are allowed to live out their lives. Unfortunately, however, little is known about laboratory animal adoption. It’s unclear how many institutions have formal adoption programs. Nor do we know how many laboratory animals are given the chance to experience “life after the laboratory” (Carbone, *What Animals Want* viii). Though we lack precise figures, however, it is probably safe to say that relatively few laboratory animals ever make it out of the lab alive.¹

And for a whole host of reasons, including the particular legal and cultural context, some types of laboratory animals are probably more likely to be adopted than others (Carbone, “Euthanasia”). Take “companion animals.” Today in the U.S., for example, dogs and cats are probably more adoptable than mice — a significant point given that far more mice are used for research than cats and dogs combined. In fact, a major reason why research on mice is thought to be less controversial than research on cats and dogs, particularly cats and dogs who were once someone’s companion, is that fewer Americans think of mice as potential companions (Birke et al. 25).

At one end of the spectrum of adoptability, some surplus laboratory animals, most notably certain surplus chimpanzees in the U.S., are legally entitled to life after the laboratory (Hua and Ahuja). In 1997, a committee of the U.S. National Research Council, over the dissent of one member, recommended that killing be discontinued as a method of “dispos[ing] of chimpanzees no longer useful for research or breeding” (National Research Council, *Chimpanzees* 39). Chimpanzees deserve this “special status,” the committee argued, because of their similarity to humans (*ibid.* 38). In 2000, the U.S. Congress enacted the CHIMP Act, which mandated the creation of a federal sanctuary system for the “permanent retirement”² of “surplus chimpanzees” owned by the federal government. The act makes it illegal to dispose of these chimpanzees by killing them. Needless to say, Congress has yet to provide for the “retirement”³ of surplus mice, rats, or fish, despite the fact that these animals make up the vast majority of laboratory animals in the United States. They continue to be routinely killed.

In this article I am interested in laboratory animals who fall on the opposite end of the spectrum from chimpanzees. Whereas chimpanzees are legally entitled to “retirement,” transgenic animals appear to be categorically ineligible for life after the laboratory, at least in Canada and the United States (Carbone, “Euthanasia”; Carbone et al.). I examine the significance of this exclusion through a detailed account of Farm Sanctuary’s failed effort to save the Enviropigs. In the spring of 2012, after losing the main source of funding for its Enviropig project, the University of Guelph, in Ontario, Canada, decided to wind the project down. As part of this process it killed its entire herd of Enviropigs, despite Farm Sanctuary’s offer to help place the pigs in permanent homes. Although the university provided several reasons for rejecting Farm Sanctuary’s offer, they all boiled down to the fact that these were transgenic pigs. Using the case of

the Enviropigs, this article grapples with what it means to create a subcategory of “laboratory animals” who are ineligible for life after the laboratory.⁴

The Social Construction of the Laboratory Animal. In an early article on laboratory animal adoption, veterinarian Larry Carbone described an objection to this practice voiced by some people involved in animal experimentation. “They will point to the fact that these animals are not pets, [that] they were bred for research, as if that fact alone should dictate their fates after the research has ended” (Carbone, “Adoption” n.p.; see also Carbone et al.). For these critics, adopting a laboratory animal as a companion animal was a “confusion of categories” (Phillips 136). (One wonders what they thought about the use of former “pets” for research.) Yet it is precisely in situations like laboratory animal adoption, when an animal is being reclassified, and is moving out of one social category and into another, that the socially constructed nature of these categories is most clearly revealed (Herzog 219-222). Individuals are not laboratory animals by nature; they become laboratory animals only when they are classified as such (Phillips).

Scholars in the field of animal studies have developed an extensive literature on the social construction of laboratory animals (see, e.g., Arluke; Birke; Birke et al. 19-33; Herzog 205-235; Lynch; Phillips; Shapiro, “A Rodent for Your Thoughts”). As these scholars explain, “laboratory animal” names a particular kind of human-animal relationship, not a particular kind of animal. And this is true even of animals bred specifically for research. It may be tempting to regard these purpose-bred animals as laboratory animals by their very nature, albeit a nature constructed for the laboratory. After all, they have been socially constructed as laboratory animals not just in the discursive sense (by being classified as such) but also in the literal, physical sense of the term (Birke et al. 18, 22; cf. Scarce). But just as animals can be reclassified, so they can be repurposed; indeed, it may even be possible to transcend the logic of instrumental use altogether and to develop ways of living with purpose-bred animals that do not involve using them, though this of course depends upon how one defines the term use.

In thinking about laboratory animals, then, critics like the ones described by Carbone conflate animals with their assigned roles (Carbone et al.). Or as Ken Shapiro might put it, they confuse “the animal as such” with “the animal as constructed” (*Human-Animal Studies* 1). Having mistakenly naturalized the social category to which “laboratory animals” happen to have been assigned, these critics find it difficult to imagine any other way of living with these animals.

How we classify other animals shapes (and is shaped by) the kinds of relationships we have with them (Arluke and Sanders 167-186; DeMello 44-55; Herzog 219-226). By denaturalizing social categories like laboratory animal, scholars in the field of animal studies hope to reveal other ways of living with the animals who have been assigned to these categories (Gross; Shapiro, *Human-Animal Studies*). This strategy of denaturalization also informs certain forms of activism, including the creation of sanctuaries for animals who were formerly farmed or used for research. By demonstrating that there are other ways of living with “farm animals” and “laboratory animals,” sanctuaries reveal the socially constructed nature of these categories (Silcox; Twine, “Is Biotechnology”).

Whether they intend to or not, laboratory animal adoption programs have a similar effect. These programs denaturalize the category laboratory animal by demonstrating that “laboratory animals” are not necessarily consigned to this role forever. Yet by forbidding adoption of transgenic animals (among others), these programs also create a subcategory of laboratory animals whose members are much more tightly consigned to the particular role or roles for which they were bred or obtained. This has the effect of circumscribing the kinds of relationships it is possible to have with these animals. We see this quite clearly, I argue, in the case of the Enviropigs.

The Case of the Enviropigs. Created by scientists at the University of Guelph in 1999, the Enviropig has been described as the first line of livestock ever genetically engineered to be more “[e]nvironment [f]riendly” (“Features, Performance, Pictures” n.p.). Enviropigs are designed to secrete phytase, an enzyme that enables them to digest phytic acid, a typically indigestible form of phosphorus found in plants, including the corn and soybeans that constitute the bulk of the feed used in industrial swine breeding and feeding. When Enviropigs and non-transgenic pigs consume this feed, the Enviropigs excrete manure that is lower in phosphorus. Like nitrogen, phosphorus is both an essential nutrient for crop production and a potential water pollutant, particularly on factory farms with such high densities of animals to farmland that they generate excess manure. These operations often use their farmland as a low-cost sink for the disposal of excess manure, a practice that causes excess phosphorus to accumulate in the soil. Storms can wash this phosphorus into streams, lakes, and other surface waters, accelerating their eutrophication. Over the past several decades, regulatory agencies in Canada, the United States, the Netherlands, and elsewhere have

promulgated phosphorus-based nutrient management regulations to attempt to address this environmental problem.

In their efforts to market the Enviropig to the pork industry, the Guelph scientists have suggested that stocking hog operations with Enviropigs would help keep the cost of complying with nutrient management regulations in check. Switching to Enviropigs

would also help cut feed costs, the scientists have argued, by all but eliminating the need to add digestible phosphate supplements to swine feed. What's more, they have claimed, the Enviropig would deliver these economic benefits while reducing water pollution and conserving the finite geologic deposits of phosphate rock from which phosphate feed supplements are derived. Yet despite the win-win appeal of these marketing claims,⁵ the pork industry has yet to license the Enviropig technology.

On March 21, 2012, a regional farming newspaper reported that Ontario Pork, an organization representing swine farmers in this Canadian province, had decided not to renew its annual funding for the university's Enviropig research (Greig). Since the late 1990s, Ontario Pork had reportedly provided more than \$1 million in funding for the project (Leung; Nickel). But with no industry licensee in sight, by the spring of 2012 the organization had decided that its limited research budget would be better spent on other projects ("Enviropig"; Quinn, "When Technology").

In the ensuing press coverage, consumer wariness and regulatory uncertainty were the two most commonly cited reasons for the pork industry's failure to adopt the Enviropig technology (Anthes, *Frankenstein's Cat*; Anthes, "Don't Be Afraid"; Maxmen, "Model Pigs"; Maxmen, "Politics"; Pollack). The availability of a much less controversial technological fix for the industry's phosphorus problem was another major strike against the Enviropig (Pollack). Instead of attempting to persuade a wary public to eat transgenic pork, the industry can simply add microbial phytase to swine feed, as a significant number of U.S. producers already do (Key et al.). Ironically enough, some microbial phytases are themselves products of genetic engineering. But whatever the thinking may have been among the major players in the pork industry, it is clear that the lack of commercial interest played a significant role in Ontario Pork's decision to stop funding the Enviropig research. The organization also thought that the research had reached a logical stopping point, a view reportedly shared by the lead researcher at the university, emeritus professor Cecil Forsberg (Quinn, "When Technology").

It quickly became apparent that Ontario Pork planned to stop funding not just active research and breeding but the maintenance of the existing herd as well. With then vice-chair Amy Cronin reportedly taking the position that the organization “funds research, not maintaining animals” (Greig n.p.), the lingering question was what would become of the last remaining Enviropigs, sixteen in all, some of whom represented the tenth generation of the line and all of whom were then being housed at the university’s Arkell Swine Research Station. As far as Ontario Pork was concerned, this was a matter for the university to decide (Quinn, personal interview).

At an April 2nd press conference in Ottawa, the Canadian Biotechnology Action Network (CBAN) welcomed news that the university had lost its funding, claiming it as an important victory in the group’s Stop Enviropig™ campaign (“Genetically Modified Pig Shelved”; Sharratt, “Remarks from Lucy Sharratt”). At the time, both Health Canada and the U.S. Food and Drug Administration (FDA) were considering whether to approve the sale of pork products derived from Enviropigs. CBAN coordinator Lucy Sharratt called on the university to withdraw its applications for regulatory approval. Concerned about negative consumer perceptions of Canadian pork, a representative of Canada’s National Farmers Union (NFU) joined with Sharratt in urging Health Canada to close its Enviropig file. If Health Canada should approve the sale of pork products derived from genetically engineered pigs, particularly without requiring that they be labeled as such, the NFU representative argued, consumers who wished to avoid genetically engineered meat might be forced to avoid all Canadian pork (Slomp). The U.S.-based Center for Food Safety echoed these concerns and called on the FDA to close its Enviropig file as well (“Canadian Hog Industry”).

At this point, several major newspapers picked up the story. With titles like “Death knell may sound for Canada’s GMO pigs,” the coverage underscored the fate not just of the Enviropig project but of the Enviropigs themselves (Nickel n.p.; see also Leung; Pollack). In a magazine article published on May 1st, Sharratt suggested that killing the pigs was an unfortunate but necessary step in the process of shutting the project down. “The hard reality now is the 16 GM pigs housed at the university need to be euthanized and incinerated under careful biosafety procedures,” she wrote (Sharratt, “This Little Piggy” 8-9). “This is a necessary step to ensure the end of ‘Enviropig’” (Sharratt, “This Little Piggy” 9). Yet even if the pigs were ultimately killed, the *New York Times* reported, the Enviropig line would still survive on ice in the form of cryopreserved genetic

material (Pollack). Using this material, scientists would be able to start breeding Enviropigs again some day if the industry should change its mind or if live pigs should be needed for additional research, perhaps in order to answer additional questions posed by regulators.

Shortly after this initial flurry of press coverage, on May 7, 2012, I interviewed Richard D. Moccia, Associate Vice-President of Research at the University of Guelph, who, along with university spokesperson Lori Bona Hunt, fielded press inquiries on behalf of the university. As the senior administrator on the case, Moccia spoke on behalf of the university. (Forsberg had refused my request for an interview.) Moccia cited three main reasons why the university planned to stop maintaining a herd of Enviropigs. For one thing, Forsberg, who had been conducting his most recent research as part of his emeritus professorship, had no plans to continue conducting research requiring live Enviropigs, and no other researcher at the university needed the pigs either. The second reason, not surprisingly, was Ontario Pork's decision not to renew its funding. And the third reason was that there had been what Moccia described as a "pause" in the university's submissions to Canadian and U.S. regulatory agencies (Moccia, personal interview). The university had also apparently come to the conclusion that it did not need to maintain a herd of Enviropigs in case regulators asked questions requiring additional research.

At the time of our interview, none of the pigs had been killed.⁶ When I asked Moccia whether the university would ever consider transferring the pigs to a sanctuary, he told me that this would violate the Animal Utilization Protocol (AUP) governing the research project. In fact, he said, the AUP prevented the university from transferring the pigs anywhere. But even if transferring them to a sanctuary were legal, he added, the university still wouldn't do it. Given the potential environmental and food safety risks, such a transfer would be "irresponsible," he argued, and would not constitute "due diligence" on the university's part (Moccia, personal interview).

Several years earlier, in 2009, Environment Canada, working in conjunction with Health Canada, had conducted an environmental assessment of the Enviropig line. The assessment concluded that Enviropigs present a low risk to the environment, so long as they are confined indoors and are subjected to other containment measures. Even as I write this in early August of 2014, Canadian and U.S. regulators still have not assessed the food or feed safety risks associated with this line of pigs, and the pigs have not been approved for consumption anywhere in the world. At the time of our interview, Moccia

was concerned that the pigs might escape into the environment⁷ or somehow wind up in the food or feed system.⁸ “We have animals escape all the time from shelters in Canada,” he told me, “and we just don’t feel that we would be willing to take the risk that a transgenic animal that originated from our university, that we produced, somehow escaped and nobody knows where it went” (Moccia, personal interview). In theory, Moccia acknowledged, it might have been possible to enter into a legal agreement requiring a sanctuary to provide adequate containment. But this would not have been enough to assuage the university’s concerns. “We’re just not satisfied that you could ever enter into that kind of agreement with the surety that you’d need,” Moccia told me (personal interview).

Although by the time of our interview the university had ruled out the possibility of transferring the pigs to a sanctuary, it was still exploring the possibility of transferring them to another university or to a private company or government agency. Yet this, too, would have violated the existing AUP. A standard AUP form available on a University of Guelph website lists several options for dealing with animals at the end of a research project: they are either retained, sold, donated/transferred, adopted, “humanely euthanized,” or dealt with in some other way (“Animal Utilization Protocol” 5). Moccia would not allow me to see the AUP for the Enviropig project, but two days after our interview he did describe its section on disposition to me:

According to our current and approved version of the Animal Utilization Protocol 10R104, section 11, *Disposition*, there are no legal provisions to sell, adopt or donate/transfer animals. All transgenic pigs generated at Arkeil are either retained (research, breeding) or euthanised, and their carcasses and any tissue/organs must be safely destroyed by an approved method (incineration, composting). (Moccia, “UG position”; emphasis omitted)

On the basis of this provision, Moccia concluded that “adoption, sale, donation or transfer would represent [a] breach of our protocol and Canadian laws and regulations” (Moccia, “UG position,” emphasis omitted). When I suggested that this provision appeared to prevent the university from transferring the Enviropigs to anyone, including to the kinds of recipients the university was seeking at the time, Moccia suggested that it might be possible to amend the AUP:

As it stands now . . . [,] a move anywhere would be precluded according to the provisions of our current AUP. [I]f we *could* find an appropriate receptor at another university, we could file for an amendment to move them, which may or may not be granted. It would obviously require that the receptor could provide the necessary containment and animal care oversight that is a mandatory part of the AUP, but we feel that we could trust another research institution since they are also bound by the same rules concerning animal use as we are.

So strictly at this time, our only legal options are to either keep the pigs alive at the University of Guelph or to euthanize them as you say, unless we could find an appropriate receptor, in which case we would request an amendment to our AUP and see what happens. But we would only do this for a research institution or university, and not an adoption group or animal shelter etc. (Moccia, "Re: UG position")

The principal investigator would be the one to apply for an amendment, and the university's Animal Care Committee (ACC) would decide whether to grant the request. Below I discuss whether there were any laws that would have prevented the ACC from allowing the Enviropigs to be transferred to a sanctuary. Setting this legal question aside for the moment, it is crucial to understand that Moccia was not approaching this matter as a purely legal issue. It also came down to trust. As his comments about the possibility of an amendment suggest, he trusted other research institutions to ensure containment and provide adequate animal care, but he did not trust sanctuaries to do so, partly because they are not covered by the same laws that research institutions are.

If a suitable recipient could not be found, Moccia told me, the university would kill the pigs. It had no plans to allow them to live out their lives on campus as "retired" research animals, though this would have been perfectly legal to do. The cost of doing so would have been difficult to justify, Moccia explained. Owing to the need for containment and specialized staff, he estimated the cost of maintaining the herd at approximately \$100,000 per year. It's difficult to imagine any university paying that kind of money, and committing scarce staff and facilities as well, just to allow a dozen or so former laboratory animals to live out their lives, except, perhaps, in the case of chimpanzees.

By mid-May, with the university's funds running out, and with no suitable recipient in sight, the fate of the Enviropigs seemed all but sealed. The issue would reopen, however, when Farm Sanctuary took an interest in the case. Farm Sanctuary runs three sanctuaries for farmed animals, two in California and one in New York; it also operates the Farm Animal Adoption Network, which places animals in permanent homes across North America. The organization got involved in this case after I contacted them on May 2nd to ask whether they would ever consider rescuing a transgenic animal.

On May 15th, Bruce Friedrich, Farm Sanctuary's Senior Director for Strategic Campaigns, wrote to Moccia by email, asking him to work with Farm Sanctuary to place the Enviropigs in "loving homes" (Friedrich, "from Farm Sanctuary" n.p.). "[R]ather than killing these poor animals," Friedrich wrote, "won't you work with us to give them a happy retirement?" (Friedrich, "from Farm Sanctuary" n.p.) "For the same reason you wouldn't kill 16 healthy dogs at the end of a research project," Friedrich continued, "please don't kill these poor pigs, who deserve a chance to live out their final years basking in sunshine, taking mud baths, and simply being pigs" (Friedrich, "from Farm Sanctuary" n.p.). Farm Sanctuary's plan, Friedrich would tell me after the pigs had been killed, was to place the pigs somewhere in Canada (personal interview).

A few hours after Friedrich made his request Moccia rejected it. "We have had many generous and well-intentioned offers from individuals and groups who would like to help find homes for our Enviropigs," Moccia wrote (Moccia, "Re: from Farm Sanctuary" n.p.). "Unfortunately," he continued, "there is absolutely no opportunity for this to occur" (Moccia, "Re: from Farm Sanctuary" n.p.). He offered a legal explanation, citing the AUP:

Our research and animal utilization protocols require us to maintain strict care and control over the Enviropigs. We are legally bound to keep the animals in closed containment, and the protocols strictly forbid the disposition of live animals to any other party at the termination of research. As such, adoption, donation or transfer of the animals would represent a breach of our protocols, as well as Canadian regulations concerning our research animal use. (Moccia, "Re: from Farm Sanctuary" n.p.)

In response to Moccia's legal argument, Friedrich suggested that perhaps the university could amend its protocols; he also requested citations for the regulations to which Moccia had referred so that Farm Sanctuary's attorneys could examine them. Friedrich also noted that laboratory animals in the United States are increasingly being adopted as companion animals or retired to sanctuaries. As an example, he cited the case of Marilyn and Madonna, two pigs whom the University of Utah had transferred to a sanctuary (Friedrich, "RE: from Farm Sanctuary"). Ignoring Friedrich's request for legal citations, Moccia explained that this was not a typical case of adoption:

Keep in mind that these are genetically modified animals, and their disposition represents a very different situation than the adoption of a normal animal, post research. Accordingly, our approved research protocols preclude any release from our facilities, and we are not considering options to attempt to amend regulations or otherwise alter our existing protocols. And I am not aware of any other universities in countries across the developed world that adopt out genetically altered livestock species from research labs. (Moccia, "Re: from Farm Sanctuary" n.p.)⁹

In reply, Friedrich expressed Farm Sanctuary's willingness to work with the university to address its concerns about containment, and he renewed his request for legal citations: "I feel certain that you would be able to change the protocols if you wished to. Are there government regulations that you believe to be insurmountable? If so, can you tell me what they are?" (Friedrich, "RE: from Farm Sanctuary" n.p.). On May 22nd, Lori Bona Hunt replied to Friedrich on behalf of Moccia, who was on vacation at the time:

As Prof. Moccia has mentioned, the University's approved research protocols preclude any release from our facilities. As well, it would violate policies re: containment and use of transgenic animals under Canadian Regulatory Authorities (Health Canada, Canadian Food Inspection Agency and Environment Canada). We are not considering options to attempt to amend regulations or otherwise alter our existing protocols. (n.p.)

The bottom line, then, was that the university had no plans to attempt to amend the AUP to allow the pigs to be transferred to a sanctuary, regardless of whether this was a viable legal option, which, it claimed, it wasn't anyhow. In her reply, Bona Hunt also

mentioned that only nine of the Enviropigs were still alive; the others had already been killed. As she explained, “all transgenic pigs generated for this research are either retained (for research and breeding) in an [sic] containment facility or humanely euthanized according to schedule” (Bona Hunt n.p.).

Farm Sanctuary’s request led to another flurry of press coverage. In the pages of various newspapers, the debate played out much as it had over email. Moccia argued that transferring the pigs to a sanctuary would be illegal, and he also cited potential food safety and ecological risks. As he told one reporter, “[t]he possibility of escapement or inadvertent release, however remote, could occur, with the possibility that they could intermix with either feral or domesticated pigs, or even end up in the human food chain by accident” (quoted in Perkel, “U of Guelph Nixes Adoption” n.p.). Farm Sanctuary’s rebuttal is best captured in a commentary titled “Save the Enviropigs,” which Friedrich published in *The Globe and Mail* on May 25th. Despite Farm Sanctuary’s repeated requests for legal citations, Friedrich argued, the university had cited no specific legal restrictions (aside from the potentially amendable AUP) that would prevent it from transferring the pigs to a sanctuary. Friedrich also suggested that the risks were manageable:

The two actual concerns we’ve heard are these: First, that the animals might breed with non-GMO animals; and second, that they might end up on someone’s dinner plate. The solutions are obvious: First, the university should spay and neuter them. And second, the university can keep strict track of them and monitor them as they live out their lives and require that their remains be returned upon their natural deaths. (Friedrich, “Save the Enviropigs” n.p.).

On May 24th, just nine days after the university received Farm Sanctuary’s request, and presumably just hours before Friedrich submitted his “Save the Enviropigs” commentary to *The Globe and Mail*, a veterinary specialist killed the last remaining Enviropigs. Or, as Bona Hunt would later put it, the pigs were “humanely euthanized” (quoted in Perkel, “University of Guelph ‘Enviropigs’ Put Down” n.p.).¹⁰ Their bodies were incinerated, and genetic material was sent to the Canadian Agricultural Genetics Repository Program in Saskatoon, where, presumably, it is now being cryopreserved (Miner; Schmidt). In addition to repeating the same arguments the

university had made all along, Bona Hunt added that “[r]eleasing the Enviropigs would ... have ... possibly compromised consumer safety and market protection,” with the latter (“market protection”) presumably referring to the market for Canadian pork (quoted in Schmidt n.p.). Lucy Sharratt reportedly described the deaths as “a ‘sad but necessary conclusion to an unwanted and unnecessary GE experiment’” (quoted in Schmidt n.p.). In a press release titled “GM ‘Enviropigs’ Meet Dead End,” she argued that “[a]ll corporate plans for GM food animals, including the GM Atlantic salmon, should die along with these GM pigs” (n.p.). Friedrich condemned the killing:

By killing 10 perfectly healthy individuals, when there was a clear and effortless alternative for the University, Guelph has forfeited any claim it might have had as anything other than a profit-driven arm of Canada’s meat industry ... We’re saddened by Guelph’s callous and mercenary killing of the enviropigs, who deserved better. (quoted in Perkel, “University of Guelph ‘Enviropigs’ Put Down” n.p.)

By the end of the day on May 24th, the day the pigs were killed, there were 3,450 signatures on an online petition to save them (“Don’t Kill the Enviropigs!”). In the days and months that followed, people continued to sign, apparently unaware of what had happened. All told, 8,347 people signed the petition, with last signature occurring on October 5th, some four months after the pigs had been killed. On April 2, 2013, nearly one year after the pigs had been killed, Guelph Students for the Ethical Treatment of Animals held an event on campus titled “Who were the ‘Enviropigs?’” (Eh-En, Samuels, and Taha). The event ended with a vigil, co-hosted with Guelph Pig Save, to remember the Enviropigs.

A Brief Look at the Law. As I explain above, the university claimed that transferring the pigs to a sanctuary would have been illegal. The legal question is whether any statutes, regulations, legally binding policies, or other laws would have prevented the university from amending the Enviropig AUP to allow for the transfer of the pigs to a sanctuary with adequate containment and animal care protocols in place. Without getting too deep into the details of my legal research, let me just say that the answer to this question is much less clear than the university suggested. I found no law that would have clearly forbidden the university from transferring the pigs. The best law I could find to support the university’s position was the Canadian Council on Animal Care’s guidelines for the use of fish in research.¹¹ In a section titled “Fish as Pets,” the guidelines state that “[n]o GM fish may be removed from research facilities to private

premises” (CCAC, *Fish* 65). Of course, these guidelines are about fish not pigs, so it’s unclear whether they would have applied in this case. Until someone tests the legal waters — something the university refused to do — we have no way of knowing how regulators and the courts will interpret the various laws in these kinds of cases. But it is also important to recognize that even if the university had the legal authority to spare the Enviropigs, it was under no legal obligation to do so. As far as I can tell, its decision to kill the pigs was perfectly legal.

Given the uncertainty surrounding the legality of allowing transgenic animals to be adopted or “retired” to a sanctuary, and in light of the potential legal liability and public relations damage if such animals should escape into the environment or end up in the food or feed system, it should come as no surprise that killing has become the preferred method of disposing of surplus transgenic laboratory animals. Indeed, like Moccia, I know of no research institution that allows these animals to be adopted or transferred to a sanctuary (see also Carbone, “Euthanasia”; Carbone et al.; Laboratory Animal Science Association, *LASA Guidance*). Every adoption policy I was able to find online is either silent on the question of adoption or explicitly rules it out. As a matter of institutional policy, then, transgenic laboratory animals appear to be categorically ineligible for life after the laboratory at most if not all research institutions in Canada and the United States. And depending upon how the relevant laws are interpreted, in some jurisdictions they may be ineligible as a legal matter as well.¹² Of course, it is possible that adoption or “retirement” is allowed in at least some institutions and political jurisdictions, and that I have simply been unable to find these examples. More systematic legal and policy research is needed on this issue.

Discussion. So what are the implications of this case for our thinking about the social construction of laboratory animals? Unless the laws, policies, and practices governing adoption are changed, transgenic laboratory animals are likely to be more permanently restricted to the particular role or roles for which they were designed than are their non-transgenic conspecifics. So in addition to being subjected to more intensive forms of containment, including physical confinement, they are also likely to be subjected to a kind of conceptual confinement as well (cf. Derrida; Pachirat 4; Twine, “Is Biotechnology”). In other words, in addition to being more tightly confined, they are also likely to be more tightly consigned to a particular social category or categories.

Beyond being bred for a particular purpose, they are likely to be more tightly restricted to that purpose and to the kinds of human-animal relationships it entails.

In a recent book on animal ethics, Clare Palmer asks us whether there are some types of human-animal relationships that “we just shouldn’t create...” (115). The fundamental question that the case of the Enviropigs forces us to grapple with is whether we ought to create a whole class of animals who are restricted to only certain kinds of relationships with humans, particularly when those relationships mostly entail instrumental use. As the percentage of laboratory animals who are transgenic continues to increase (Ormandy et al.), we need to ask ourselves whether it is acceptable for fewer and fewer laboratory animals to be eligible for life after the laboratory.

To be fair, at no point in the controversy over the disposition of the Enviropigs did the university ever claim that the pigs should be regarded only as laboratory animals or as farm animals. Rather, the university’s arguments focused mainly on the need for adequate containment and animal care. Although Moccia did assume that these could be provided only by institutions that would have likely used the pigs as laboratory or farmed animals, this was not the same as saying that the pigs should be consigned to these particular social categories. Similarly, when a research institution enacts a policy making transgenic animals ineligible for adoption, this is not necessarily an effort to restrict human-animal relationships. We should not be too quick to read these policies as implicit assertions that transgenic animals should exist only to serve the particular purpose or purposes for which they were designed. In fact, I know of no policy that forbids laboratory workers from developing companion-like relationships with transgenic animals in the lab. If the case of the Enviropigs is any indication, then, the current reluctance of research institutions to allow adoption of transgenic animals does not appear to be motivated by a desire to restrict human-animal relationships. Rather, this reluctance seems to be motivated mainly by legal concerns, and by a desire to avoid a PR nightmare should an adopted transgenic animal escape into the environment or wind up in someone’s food.

Yet whatever the intent behind these policies may be, it is clear that they do indeed restrict human-animal relationships. After all, having a companion-like relationship with a transgenic animal in a lab, particularly an animal who is still an actual or potential research subject, surely differs in significant ways from living with a transgenic animal in one’s home or caring for one at a sanctuary. So even as adoption policies expand the kinds of relationships it is possible to have with “laboratory

animals” who are deemed to be eligible for adoption, they restrict the kinds of relationships it is possible to have with “laboratory animals” who are deemed to be ineligible for life after the laboratory. And in the case of transgenic animals, these policies typically create a bright-line rule that admits of no exceptions. Instead of addressing adoption on a case-by-case basis, the policies deem all transgenic animals ineligible, regardless of the nature of the animal and regardless of whether a potential adopter or sanctuary has the ability to provide adequate containment and animal care. Although this kind of policy makes sense if an institution must comply with a law that itself creates a bright-line rule against life after the laboratory, this simply begs the question of why such a law should exist in the first place. After all, if it is legal to farm an Enviropig so long as adequate containment measures are in place and adequate animal care is provided, then why should there be a bright line rule against allowing an Enviropig to live out his or her life at a farmed animal sanctuary with the same (or even better) animal care and containment protocols in place? Perhaps it’s time for a more science-based approach to the question of whether transgenic animals ought to be eligible for life after the laboratory.

Conclusion. Until some time in 2013, two transgenic goats were on display at the Canada Agriculture and Food Museum in Ottawa. Developed by the now defunct company Nexia Biotechnologies, these Spider Goats were designed to secrete spider silk in their milk. I cannot say for certain how the goats arrived at the museum, or whether all the relevant laws and policies were followed, but the reaction to this exhibit reveals one of the unintended consequences of policies that classify transgenic laboratory animals as ineligible for life after the laboratory.

In March of 2012, CBAN accused the museum of promoting genetic engineering. The goats functioned as a kind of living PR for the biotechnology industry, CBAN argued (“Genetically Modified Goats”). When I interviewed Sharratt about the Enviropigs, she brought up the case of the goats (personal interview). She was concerned that transferring the Enviropigs to a sanctuary would help normalize transgenic animals, just as the Spider Goat exhibit had done.

As Emily Anthes explains, having a “close, personal encounte[r]” with a transgenic animal, as Anthes did when she first saw a Glofish at a pet store, can help dispel certain fears about them (*Frankenstein’s Cat* 31). Creating personal encounters with farmed

animals is exactly what Farm Sanctuary aims to do by inviting the public to tour its sanctuaries. After feeding a pumpkin to an Enviropig, a visitor might leave just a little less receptive to the Frankenpig frame, which, to her credit, Sharratt has avoided using in CBAN's work. Of course, even if the Enviropigs had been allowed to live out their lives at a sanctuary, they might never have gotten to go outside. And if, as a result of biosecurity requirements, they would have had to have been subjected to more intensive confinement than other pigs, their uniqueness as transgenic animals may well have been reinforced in visitors' minds. The public's perception of the pigs ultimately would have depended upon how the pigs were presented.

As Richard Twine explains, the development of transgenic farmed animals is caught up in "a politics of the new" (*Animals as Biotechnology* 22). Using frames like Frankenpig and Frankenfish, critics suggest that these animals are radically different from the ones the public has grown accustomed to eating, while the industry strives to convince both the public and regulators that there is really no meaningful difference between the two. Indeed, "when introducing live Enviropigs™ to the public," Susan McHugh explains, "scientists [took] care to normalize these GM creatures as ordinary meat animals" (*Animal Stories* 208). Some members of the press aided in the project of normalization. Consider how a BBC reporter described his visit to the Arkell facility in January of 2011: "The animals inside the clean, warm barns look like normal pigs and behave like normal pigs," he explained, "but they are living, breathing wonders of modern science" (Cooke n.p.). A video accompanying the story shows seven pink Enviropigs playfully nipping at the reporter's rubber boots. No Frankenpigs here.

Adoption policies have important implications for efforts to normalize transgenic farmed animals. Until they are approved for use as food, transgenic animals like the Enviropig will remain laboratory animals. Making these and other transgenic laboratory animals categorically ineligible for life after the laboratory only serves to reinforce the notion that they are radically different from their non-transgenic conspecifics. This surely presents a challenge for institutions seeking to assuage public concerns about these animals. Their policies may ultimately end up backfiring, exacerbating the public's concerns and unwittingly reinforcing the Frankenfood frame.

Notes

1. I'm aware that using the phrase "laboratory animal" has the potential to naturalize the use of animals for research. I address this issue later in the article. But there is

another reason to be wary of the phrase. Talking about surplus laboratory animals is potentially misleading given that many of these animals never even enter a lab (cf. Birke et al. 32-33, 37). Some are killed in the breeding facility where they were born, whether at a commercial breeder or in a research institution's own in-house breeding facility, while others are killed in the animal care facility, which is the place in a research institution where animals are held as potential research subjects. Future research is needed to trace the various fates of animals who are bred or obtained for research — or who are the unwanted byproducts of efforts to breed animals for research — but who, at some point, whether after having been used for breeding or research or not, are deemed to be surplus stock (for a start, see Laboratory Animal Science Association, *The Production and Disposition*; Wolfenshohn).

2. In 2007, Congress strengthened the definition of “permanent retirement” by restricting the kinds of research that may still be conducted on chimpanzees after they have been transferred to a sanctuary.

3. Use of the term retirement in this context needs to be interrogated, and not just to determine whether the respite from research is permanent. Compared with terms like rescue, the term retirement depicts research institutions in a much more favorable light (Carbone et al.). “Rescue” implies that the breeder or research institution from which an animal is removed is a source of threat, which it arguably is in the case of surplus animals who are slated to be killed, assuming, that is, that even a relatively painless and stress-free death would constitute a harm to a member of the particular species at issue (for a discussion of this issue, see Palmer 129-137). Yet as the legislative history of the CHIMP Act demonstrates, the term retirement has its own set of political disadvantages. During the debates that led up to the passage of the Act, some members of Congress suggested that chimpanzees were being provided with a cushier retirement than many of these members' constituents were receiving. The term retirement is also interesting insofar as it implies that laboratory animals are engaged in a form of labor (for a discussion of this issue, see Clark, “Labourers or Lab Tools?”).

4. My account is based on several sources of data: press coverage, email correspondence between the university and Farm Sanctuary, statements published by key participants in the case, and interviews with these participants. I also conducted a legal analysis of the university's policies, along with the relevant national, provincial, and municipal

laws that governed the university's decision regarding the disposition of the Enviropigs.

5. An assessment of these claims on their merits is beyond the scope of this article.

6. Moccia counted fifteen, not sixteen, as had been reported in the press.

7. I appreciate the irony of the university describing these pigs as environmentally friendly and then expressing concern that they might end up in the environment. Unfortunately, I do not have space in this article to discuss what is known about the potential ecological risks associated with feral Enviropigs (but see National Research Council, *Animal Biotechnology* 11, 78, 84, 87).

8. Ten years earlier the university had suffered its own biosecurity breach. In February of 2002, the *Guelph Mercury* reported that 11 dead "Enviropiglets," as another journalist would later call them (Clarren n.p.), had been "mistakenly taken to a rendering plant" and cooked along with other animal carcasses (Kirsch n.p.). This batch of cooked carcasses was then sold to feed mills, which used it to make feed for laying hens, broiler chickens, and turkeys. When this mishap was revealed to the public, officials from the Canadian government attempted to assuage consumer concerns, asserting that anyone who had eaten eggs or flesh from birds who had eaten the feed had nothing to worry about — an interesting claim considering that regulators had not (and still have not, as of early August of 2014) assessed whether food derived from the bodies of Enviropigs is safe to eat.

9. The university's policies on adoption deal only with dogs, cats, and equines. They make no mention of transgenic animals ("Animals in Research and Teaching").

10. For an analysis of this misuse of the term euthanasia, see Clark, "Killing the Enviropigs."

11. I thank Gilly Griffin, Guidelines and Three Rs Programs Director at the Canadian Council on Animal Care, for this reference.

12. For example, the U.S. Food and Drug Administration's current guidelines on the regulation of genetically engineered (GE) animals recommend that all unapproved (and thus still experimental) GE animals be killed when they are no longer needed, except in special cases where the agency's "safety concerns are met" (*Guidance for Industry* 11).

The kinds of exceptions the agency mentions have to do with allowing animals to enter the food chain. The guidelines make no mention of adoption or transfer to a sanctuary.

Perhaps these would be allowed if the agency's safety concerns were met, but this is by no means clear.

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