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The Pigs That Therefore We Are: Anatomy, Biology, and Transplantation

The Huangpu, Athwart Pigs

When more than 16,000 pigs started floating down China's Huangpu river, the local response was confusion. The Huangpu, which serves as a principal source of Shanghai's drinking water, had become a site of disposal for pigs carrying porcine circovirus (PCV), a single-stranded DNA virus. Alarmed commentators were quickly calmed: circovirus does not affect humans. Circovirus, it appears, only affects pigs. And yet in 2010, when the FDA recommended against the use of Rotarix, a vaccine intended to fight rotavirus, it was due to the appearance of PCV DNA in the vaccine, possibly present from the first stages of product development. Pigs, of course, were the cause, particularly their DNA used at early phases of clinical testing. Circovirus affects humans after all. The deceased, floating pigs of the Huangpu are entirely real, but they also sailed down the river like a "return of the repressed" for a system of industrial agriculture massively over-producing these porcine beings at the expense of a genuine consideration of their health and well-being. Though pigs, as pork, form an essential part of diets and pigs, as iconography, play a significant historico-symbolic role in China,¹ the Huangpu pigs were little more than trash, whether they were polluting once-pristine streams or festering as unwanted industrial waste.

Though pigs are widely acknowledged to be one of the most intelligent non-human animals² — Aristotle would call them "the animals most like people"³ — in America the consideration of porcine beings largely ends at the dinner table. "People say, 'Oh yes, pigs really are rather clever, aren't they?'" says professor of evolutionary psychology, Richard W. Byrne, and then they take a bite from their Chipotle carnitas burritos.⁴ Modern industrial agriculture, particularly its oft-reviled Concentrated Animal Feeding Operations (CAFOs), produces

¹ The Mandarin character for house includes the radical "shī," meaning pig.

² Natalie Angier, "Pigs Prove to Be Smart, if Not Vain" (November 9, 2009).
http://www.nytimes.com/2009/11/10/science/10angier.html?_r=0.

³ Brett Mizelle, *Pigs* (London: Reaktion Books, 2011): p. 31.

enormous quantities of these beings to feed a rapidly growing world population whose hunger for pork sees little risk of diminishing. Looking backwards in both Eastern and Western history, it is difficult to locate a moment when pigs were not, at least somewhere, becoming-pork.

When Emøke Bendixen and colleagues wrote in a 2010 literature review on the potential of pigs to become “model organisms” for the study of human disease, a prominent reason cited for pigs’ high “utility” for biomedical research could have emerged straight out of a CAFO industry PR pamphlet:

The size of pigs obviously makes them less suited for keeping and studying in laboratory facilities than the rodent model, but the agricultural industry produces 1 billion pigs every year globally [5]. Thus, industrial pig production represents a valuable resource from which experimental animals can be selected ... Making full use of this exceptionally large biological resource for developing useful biomedical animal models has so far been hampered by the relative lack of information about the molecular biology of the pig, which does not currently match the vast amount of biological information available on classic model organisms like *Drosophila* [8] and rodents [9].⁵

Pigs are prime targets for the status of “model organism” in biomedicine because, unlike the “fruit fly (*Drosophila*), zebrafish and rodents,” porcine “anatomy, genetics and physiology ... reflect human biology more closely than the classic animal models.”⁶ The rhetoric of “reflection” and the fact that pigs “mirror” various human systems emphasize that the scientifico-rhetorical construction of *similarity* is crucial to establishing pigs as a new “model organism.” We are looking, in other words, for something just like us that can carry human disease like we do, that can replicate those disease’s effects, and, simply enough, that can suffer like us. The problem with establishing pigs as model organisms — henceforth, creating “model pigs” — resides in an information deficit about porcine genomic and proteomic information. In other words, we do not completely understand the “mapping” of pig genomes and pig organs onto the human. The pig — the real, living and feeling porcine being — is reduced to a bank of information.

Completely absent from the paper, which purports to “highlight the current progress of these ongoing areas of research,” is any consideration of the ethicality of creating “model pigs,” or any nuanced consideration of factory farming as such. Factory farms simply are, pigs simply

⁴ Angier, *ibid.*

⁵ Bendixen, Emøke, Marianne Danielsen, Knud Larsen, and Christian Bendixen. “Advances in Porcine Genomics and Proteomics - a Toolbox for Developing the Pig as a Model Organism for Molecular Biomedical Research.” *Informational Genomics* 9, no. 3 (2010): 209.

exist, and the fortunate combination of the two is a wonderful boon for genetic research attempting to unlock the secrets of human disease. The unproblematic acceptance of porcine sacrifice to alleviate human suffering is omnipresent in literature on model pigs: we have produced a lot of pigs, might as well use them for science. This trope forms the rhetorical structure of what I call “porcine standing reserve,” a particularization of Martin Heidegger’s use of “standing reserve” to describe technological thought’s reduction of the world into energy available for human use.⁷ This twerked deployment conveys something beyond its terminological novelty: pigs have been, more than their non-human “medical model” brethren (rats, dogs, cats, apes and others), historically mediated by human collection and corralling; that mode of interaction has *defined* their ontological status in relation to “human” beings. From their very outset, “pigs” were an artificial construction: domestication, hybridity, and cultural narratives created a thing called “pig.” Thus, the promulgation of scientific narratives about pig “models” and the waste-ness of pigs actively create — or shift — that thing we call “pigs.” And pigs — the “dirty” pink beings with corkscrew tails — have shaped science. Science, particularly biology and anatomy, has explicitly porcine beginnings.

There is something paradoxical in an unproblematic affirmation of the “model pig.” To unravel that paradox is the goal of this paper. If the purpose of better understanding human disease is to alleviate the suffering that it brings — schizophrenia, cystic fibrosis, and cancer are all areas where model pigs could generate scientific enlightenment — then why do organisms chosen for their similar “anatomy, genetics and physiology” warrant so little ethical consideration? Why do we accept porcine sacrifice for human salvation? Why do pigs not seem to suffer? As is immediately clear, an investigation into this question stretches across many centuries and multiple disciplinary contexts: the construction of pigs in science was also a cultural and economic question from its earliest moments. Thus, this paper will restrict itself to three, rough historical moments, even as its analysis constantly spills over and beyond my self-imposed boundaries: first, the early anatomical texts written across roughly a century in Italy; second, the emergence of fetal pigs as waste bodies for dissection and places from which to extract general mammalian knowledge; and third, the recent debate over the use of “model pigs”

⁶ Ibid., 208-209.

⁷ Martin Heidegger, “The Question Concerning Technology” *Basic Writings* (New York: Harper Perennial, 2008).

for potential xenotransplantation of organs from porcine bodies into human ones. At all three moments, one sees a scientific willingness to offer pig bodies as oblations for the sake of better understanding human ones. That willingness, I will suggest, is intricately related to another characteristic possessed by pigs, beyond simply their similarity: their “edibility.”

Yet consumed, cut up, or grown, the Huangpu and the “model pigs” float back into the picture whenever or wherever we least expect them. Whether it is fear of disease from xenotransplantation, the difficulties of making fetal pigs *like* us, or simply the final aquatic voyage of the Huangpu pigs, “real” pigs, and not simply their informatic bodies, keep interrupting the scientific attempt to “de-pig” the pig. This paper, following in the vein of attempts at “multispecies ethnography,”⁸ attempts something like a “multispecies history” by tracing, following, and highlighting porcine bodies in a history of their modeling and capture which often acts as if they were never alive in the first place. Pigs, more dramatically and extensively than many other domesticated animals, have been both materially and symbolically deprived of agency. The pigs that used to “roam the countrysides” (of our cultural imagination, if nothing else) are now confined to industrial slaughterhouses with chilling similarities to the concentration camps of Nazi Germany. The “Terminator Pigs” of the ancient Americas have been replaced, in our predominant subjective conceptions of “the pig,” with pink corkscrew-tailed *Babes* — even as “real” pigs die by the millions every year. Even scientific narratives about pigs tend to reduce them to bystanders in the great human drama of scientific progress. When Bendixen and his co-authors discuss industrialized pigs as a “valuable resource” for medicine, living pigs themselves are concretized as *little more than* resources: porcine standing reserve.

But as Brett Mizelle suggests, vis-a-vis the debate over pig domestication, “it is possible that ... pigs in some sense ‘chose’ domestication, or at least were more integral to the process than earlier anthropocentric models that made domestication solely a matter of human agency.”⁹ In a very similar way, scientific narratives — particularly in the way that the debate on “model organisms” proceeds in medical journals — have depicted porcine beings as determined monocausally by “human agency.” I try to reverse this by reading history, economics, and

⁸ Kirksey, S Eben, and Stefan Helmreich. “The Emergence of Multispecies Ethnography.” *Cultural Anthropology* 25, no. 4 (October 13, 2010): 545–576. doi:10.1111/j.1548-1360.2010.01069.x.

culture *athwart* pigs,¹⁰ and more contextually, how pigs *dirty* accepted boundary distinctions. The end of the paper gestures toward fugitive forms of porcine agency: how pigs have, in some sense, “chosen” their involvement with scientific research and also, more importantly, how they have refused. Their efforts to escape — their “fugitivity” — from various forms of captivity will haunt the present piece. My interest in this question mirrors, closely if idiosyncratically, Fred Moten’s attentiveness to “that constant escape of life, that constant escape of the bios.... a kind of fugitivity.”¹¹ Pigs have escaped human attempts at capture, repeatedly, and the finale of the paper engages with moments when the eater’s place at the table “turns.” The following is an initial, if necessarily incomplete, archaeological dig, looking to retrieve a place for pigs in the sty of biology and culture.

The Loathsomeness of Expression

The pig made its most prominent early appearance as a pedagogical and medical object in the work of the famous Greco-Roman anatomist, Galen. Galen wrote, concerning his choice of pigs over apes in experiments connecting “lesions in the nervous system” to the voice, that cutting open a pig allowed him “to avoid seeing the unpleasing expression of the ape when it is being vivisected.”¹² Apes, Galen noticed quickly, find little enjoyment in live dissection. An equally important reason to prefer a pig in anatomical experiments that include injuring an animal’s vocal capacities is that “the animal on which the dissection takes place should cry out with a really loud voice.”¹³ Based on his *On Anatomical Procedures*, Galen appears to have made liberal use of pigs to demonstrate various aspects of biological functioning “because there is no advantage in having an ape in such experiments and the spectacle is hideous.”¹⁴ An unspoken cause of Galen’s preference for pigs rather than apes was an economic one: “Pigs were an important food in ancient Greece, as they were economical to raise, easy to sell and good to eat.”¹⁵ Pigs would remain “an important food” and popular object of hunting in the Roman

⁹ Mizelle, 15.

¹⁰ Stefan Helmreich, *Alien Ocean* (Berkeley: University of California Press, 2006): 21.

¹¹ Fred Moten, “The Insurgency of Objects.” 123678945 Vol. 1 (November 7, 2005).

¹² Galen. Duckworth WLH, trans. *On anatomical procedures, the later books*.

(Cambridge (MA): Cambridge University Press, 1962): 15.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Mizelle, 32.

Empire of Galen, making them quite a bit easier to come by than apes.¹⁶ Primates were part of a marvelous and unbelievable trade in exotic species throughout the Roman Empire, but they existed primarily as pets imported from military conquests or trading partners in Asia Minor or Africa. That status, with its hint of a “companional” distinction between pigs and apes, would have made them expensive, particularly when considering the disposability of animals destined for Galen’s dissecting table.¹⁷ Pigs were, however, domestically raised and would have been relatively easy to come by — wealthy Romans may have even possessed their own private boar-hunting parks.¹⁸

In one of his most popular, public demonstrations — “Many distinguished politicians and scholars [even] came, including Alexander Damascenus, an Aristotelian philosopher...”¹⁹ — Galen “showed them [the nerves controlling breathing] and how damage to the nerves activating the muscles of the larynx results in a loss of voice” in a live pig.²⁰ With a single cut, the “really loud voice” was silenced almost immediately. The crowd loudly expressed its shock and wonderment. Galen’s public medical spectacle was, perhaps, “the first experimental and publicly repeatable evidence that the brain controls behavior.”²¹ That spectacle revolved entirely around the mute pig.

In his various references to porcine creatures, Galen avoids any claim even approximating the discussions today of the pig as a medical “model” for human disease. His proclivity for pigs was much more closely tied to a series of pragmatic concerns than to the exemplarity or similarity of the pig — Galen still regarded the ape as being much more “similar” to humans. At one point, he does go far enough to suggest that “there is no need to dissect any living animal except pigs or goats” in order to understand the general relationship between spine and voice.²² Yet his point is never explicitly that one can “map” the anatomical aspects of the pig body to the human body — throughout most of the text, Galen’s comparisons concern the proximity of pig anatomy to *ape*, rather than human, anatomy. Instead, his point is that the *voice*

¹⁶ Ibid.

¹⁷ J. Donald Hughes (2003): Europe as Consumer of Exotic Biodiversity: Greek and Roman times, *Landscape Research*, 28.1: p. 24.

¹⁸ Mizelle, 33.

¹⁹ Charles G. Gross, “Galen and the Squealing Pig,” *The Neuroscientist*, p. 218.

²⁰ Ibid., 219.

²¹ Ibid., 220.

²² Galen, 87.

“of the pig is loud and strong.”²³ Much the better, then, to show your results to the interested public and experience “for yourself” the connection between the nervous system and vocal utterances. There is, then, a performative reason to select the pig as your dissection animal. As he writes, “leave the live apes alone, and turn to these animals.”²⁴

There is another dimension, however, to the decision about the most suitable animal for anatomical dissection, “for in all animals which have a larynx... the expression in vivisection is not the same.”²⁵ Beyond the spectacularity of having the “squealing pig” silenced, then, there is also a strong ethico-affective reason to prefer the pig over the ape. The “expression” of the ape is difficult for the industrious anatomist to stomach and, while the reasons for it remain unspoken, the mute pig seems to arouse no such sympathy. Galen is quick to caution that you can and should still dissect an ape, to “extend your studies.” But this dissection can be satisfactorily done on “a dead man and an ape,” rather than a live subject.²⁶ The pig — the goat is acceptable, as well, but Galen’s preference toward porcine dissections is clear throughout *On Anatomical Functioning* — is the non-human animal that the anatomist can do violence to with the least psychological unease. And *violence* seems an inescapable description for procedures like this one:

Should you have progressed so far that you have been able to discover this nerve, then draw it upwards far enough to enable you to ligature it, if you want, or to damage it in some other manner. If you do that, you see that the tone of the exhalation of the animal, which still persisted after the damage to the recurrent laryngeal nerve, becomes lost... And you observe also that as a result of the damage which has involved the muscles and the remaining nerves of the larynx, only a very slight change comes over the voice in respect of its weakness, power, sharpness and depth.²⁷

Galen may have been one of the first to engage in frequent and documented dissections of pigs — he certainly popularized the practice and it would only become more economically reasonable with the vast increase in pig husbandry throughout Europe²⁸ — but he puts forth one

²³ Galen, 88.

²⁴ Galen, 87.

²⁵ Ibid.

²⁶ Ibid., 86.

²⁷ Ibid., 107.

²⁸ Mizelle, *ibid.* See also: SOFIE VANPOUCKE, FABIENNE PIGIÈRE, ANN DEFGNÉE & WIM VAN NEER, “Pig husbandry and environmental conditions in northern Gaul during Antiquity and the early Middle Ages: the contribution of hypoplasia analysis” *Archaeofauna* 16 (2007): 7-20.

of the earliest and clearest *comparative* justifications for using porcine beings for medicine and biology. He does so through a discourse which reemerges repeatedly throughout the historical collision of pigs and medicine: the “non-companionability” of the pig or the economic “edibility” of the pig. Unlike the ape, which resembles humans too much for comfort, or the dog, to which we maintain provisional pet-inspired sentiments, pigs lack the “loathsomeness of the expression” that arouses ethical concern from the “man of science.”²⁹ Why, though, does this difference in capacity to arouse ethical sentiment occur? Though Galen provides no immediate answer, the pieces of the discussion so far can formulate a “working hypothesis” on the subject: the combination of the “industrial” and “consumptive” relationship of humans toward pigs shapes, dramatically, the range of possible ethical feeling that the animals could create. Cutting into pigs, Galen teaches us, is easier: “Previously I have also said that it is best if the animal be a pig.”³⁰ Galen contributed, perhaps more than any previous thinker, to the creation and centralization of the pig *as* critical object of anatomo-scientific inquiry.

If Galen was an early exemplar of the medical interest in pigs, the centrality of the porcine body as a tool to grow anatomical knowledge would continue in the work of the anatomists and biologists at the Salerno institute during the early Medieval period. Largely due to a difficulty in acquiring human corpses for dissection, the Salerno scientists used “porcine dissections” to create “one of the first European anatomic texts”³¹ — like Galen’s work, the text created at Salerno was pedagogically focused from the outset. “The Anatomy of the Pig,” the textbook created for the students of Salerno, sets out to improve upon and respond to Galen’s progress:

Because the structure of the internal parts of the human body was almost wholly unknown, the ancient physicians, and especially Galen, undertook to display the positions of the internal organs by the dissection of brutes. Although some animals, such as monkeys, are found to resemble ourselves in external form, there is none so like us internally as the pig, and for this reason we are about to conduct an anatomy upon this animal.³²

²⁹ Gross, 85.

³⁰ *Ibid.*, 105.

³¹ Zoë Alaina Ferraris and Victor A. Ferraris, “The Women of Salerno: Contribution to the Origins of Surgery From Medieval Italy,” *Ann Thorac Surg* 1997, 64: 1855-1857 .

³² Anonymous, George W. Corner trans., “The Anatomy of the Pig” [http://wb.westernstandard.com/nxt/gateway.dll/sc/scgs/0002%20a%20source%20book%20in%20medieval%20science/010002-00099.xml?fn=document-frame.htm\\$f=templates\\$3.0](http://wb.westernstandard.com/nxt/gateway.dll/sc/scgs/0002%20a%20source%20book%20in%20medieval%20science/010002-00099.xml?fn=document-frame.htm$f=templates$3.0).

Expanding upon Galen, who classifies animals into “six classes” of similarity to human, the Salerno scientists articulate a sub-division of similarity: internal and external likeness. Thus, while monkeys may resemble humans “in external form,” it is in fact the pig that shares the strongest resemblance in terms of internal organic composition. The Salerno text goes no farther than this: no explanation of what similarities there are, how they are known, etc. It is highly likely that the choice of pigs was a direct response to the inability to dissect human cadavers.³³ But while “Western anatomical study did not spring full-fledged from the slit torso of a pig,” it is clear that the pig dissections at Salerno were an important step in the evolutionary process of anatomically dissecting bodies.³⁴ The Salerno school played an essential role in spreading the anatomical teaching of Galen, as well as the post-Galen discoveries of Arabic scientists, throughout Europe:

Translated from arabic into latin, medical knowledge was passed to the school of Salerno in the tenth and eleventh centuries, where it spread outwards so that, by the thirteenth century, four major centres of medical teaching were flourishing in Europe: Salerno, Bologna, Montpellier, and Paris.³⁵

Perhaps most importantly, at Salerno the pig becomes a stand-in *for* the human body. That is, when the anatomists at Salerno select the pig rather than the ape as the object of their dissection, they are also engaging in a critical effort to render human and pig bodies internally translatable, rather than simply analogous. The pig becomes a surrogate human when it comes acquiring medical knowledge and, specifically, for teaching that knowledge to students through “hands on” dissections. The “porcine body” becomes an educational and anatomical object for understanding the human body: “human” and “pig” organs are, in a sense, emptied of their containers; a biological eversion of Deleuze’s body-without-organs. The “pig” becomes organs-without-body which is most “like us internally.”³⁶ Similarities in outward appearance will have decreasing importance as dissection as a practice grows. This shift appears most importantly and powerfully in the work of Vesalius, the most influential anatomist in history, who would prefer,

³³ Nancy G. Siraisi, *Medieval & Early Renaissance Medicine: An Introduction to Knowledge and Practice* (Chicago: University of Chicago Press, 1990): p. 86.

³⁴ Ibid.

³⁵ Jonathan Sawday, *The Body Emblazoned: Dissection and the Human Body in Renaissance Culture* (New York: Routledge, 1997): 36.

³⁶ Siraisi, 86.

once again, pigs as his dissective animals to monkeys. The title page of the 1604 edition of his *Fabricus* includes an elaborate engraving displaying:

a triumphal arch, its niches filled with various anatomical figures; in the archway, Vesalius is seen performing a dissection in the presence of several learned colleagues, while above him, reclining on the sloping sides of a broken pediment, are shown two animals of special significance to the professional reader: a pig, commonly used for vivisections because its inner organs were regarded as similar to those of man,³² and an ape, the source of Galen's mistakes and the creature closest to man in its bony structure.³⁷

If our above analysis was accurate, the drawing seems to display not simply Vesalius's preference for the pig over the ape, but the difficulties of Galen as well.

But the story appears a bit *too* simple — that pigs were chosen because they were most “similar” might be *correct* by today's standards, but it appears, particularly in the case of Salerno, like something of a Münchhausen trilemma. There were, after all, quite a few possible animal substitutes for the human body, and knowledge of anatomy at the Salerno school in the eleventh century was nowhere near its current situation where discussions about porcine-human similarity still repeatedly reach stumbling blocks of comparison. We are right to wonder what we asked of Galen as well, “Why the pig?” The answer, as I have already suggested, is inextricably tied to the economic production and edibility of the pig, and not simply to science's search for medical truth.

In Rome, pig consumption was tremendously common. Yet that they were eaten widely barely exhausts the importance of porcine creatures in Roman times. After all, “no other animal had so many Latin names (e.g., *sus*, *porcus*, *porco*, *aper*) or was the ingredient in so many ancient recipes as outlined in the culinary manual of Apicius” as the pig.³⁸ As the Roman agronomist Varro wrote, “who of our people runs a farm without keeping pigs?”³⁹ Based on a mix of written references and archaeological remains, Michael Mackinnon argues that pigs almost certainly made up a substantial part of the Roman diet, whether rural or urbane. Indeed, based on recovered bones, there appear to have been at least two breeds of pig — with the smaller one dominant in cities, suggestive of economic importation — and “the overall size of pigs tends to

³⁷ H. W. Janson, “Titian's Laocoon Caricature and the Vesalian-Galenist Controversy” *The Art Bulletin*, Vol. 28, No. 1 (Mar., 1946): p. 52.

³⁸ Michael Mackinnon, “High on the Hog: Linking Zooarchaeological, Literary, and Artistic Data for Pig Breeds in Roman Italy,” *American Journal of Archaeology*, Vol. 105, No. 4 (Oct., 2001): p. 649.

increase slightly over time, suggestive of improved breeding conditions through antiquity.”⁴⁰ As Rome entered the fourth and fifth centuries, the specialization of pig sellers appears to have increased as well. The economics of pig production were well-developed, as domestication made them both more accessible and easier to farm throughout the Empire (whether in forests or stalls). At the time of Galen’s writing, around early 200 AD, raising pigs on large Roman farms and selling pigs in city markets would have been tremendously profitable operations — though they would see continued expansion — and it is no accident that this animal which appears to have been so widely sold and consumed appears as the logical choice for dissection in Galen’s medical treatises.⁴¹

The pig would have appeared to Galen as both a quotidian victim of sacrifice and consumption. And Galen makes clear repeatedly that he *has* eaten pigs: “Take pigs, for example: even if the spleen is not as good as the liver for eating, yet it is not inedible.”⁴² Even larger scale production of pigs as a source for food was very clear to Galen, who describes the shift from a time when “acorns were formerly forage for pigs... [until] instead they slaughtered them at the beginning of winter and used them for food.”⁴³ Perhaps the clearest discussion comes in his text “On the Powers of Foods: Book 3,” where he extols the value of consuming pork: “Of all foods, therefore, pork is the most nutritious... As regards the digestion, pork is far better, both for those in the prime of life, the strong and people who pursue the activities of those in their prime, and also for anyone else who is still growing.”⁴⁴ Galen clearly understands the consumptive importance of pigs: they help young Romans grow, they contain the most nutritious flesh, etc. And when he turns to the various animals that are, today, dissection alternatives to the pig, he appears much less confident and knowledgeable: “As for the dog, what can I say?” When he arrives at the “little animal in Spain looks like a hare (which people call a rabbit),” Galen can

³⁹ Rust. 2.4.3

⁴⁰ Mackinnon, 657.

⁴¹ Ibid., 667.

⁴² Galen. Mark Grant trans., “On Black Bile” in *Galen on Food and Diet* (London: Routledge, 2000): p. 30.

⁴³ Galen. Mark Grant trans., “On the Powers of Foods: Book 2” in *Galen on Food and Diet* (London: Routledge, 2000): p. 136.

⁴⁴ Galen. Mark Grant trans., “On the Powers of Foods: Book 3” in *Galen on Food and Diet* (London: Routledge, 2000): p. 154.

provide no recommendation on edibility, for he presumably had never seen such an animal.⁴⁵ Yet when he comes to discussing the “extremities” of the animal, Galen is quick to suggest “piglet’s trotters” over “their noses” which are better than the “ears.”⁴⁶ The pig becomes the model of *consumption* for other animals, a proposition of Galen’s which is of no small importance when considering the selection of the pig as the object of science: “Note that the relationship between what I am saying here *with the rest of the animals* is the same, because the gap in excellence between the food from the extremities and the meat of pigs, mirrors the gap between the extremities of pigs and the *corresponding parts* of other animals.”⁴⁷ [Emphasis mine] Galen’s recommendations for consuming pig links with his vivisections to form a veritable *carnivorous* anatomy. We could say, further, that Galen’s science — because his dietary suggestions and anatomical investigations were not isolated endeavors — was *a priori* a carnivorous one.

The individuals present for his famous “mute pig” spectacle would have been high-class and comfortably living Romans — diplomats and philosophers, as well as lower class spectators — for whom pig slaughter, as food and religious ritual, would have appeared equally quotidian. In Rome, coincident both with some of the largest early advances in anatomical learning under Galen and the beginning of the use of pigs as objects of medical knowledge, we see the large-scale industrial manufacture of porcine bodies — an early porcine standing reserve. The cultural “edibility” of pigs, if we take Galen at least somewhat at his word, was incredibly well-defined: pigs were very rarely described as pets (wealthy Romans would have chosen more exotic species, like monkeys or birds) and are instead nearly always the victims of sacrifice or consumption.⁴⁸ Though it extends beyond the aim of the current work, the relationship between sacrifice to the Gods and sacrifice to anatomy also seems well-defined: pigs and goats are the two animals that Galen is most willing to cut open for science, and these two animals were two of the most common sacrificial victims at the altars of Roman temples. The pig, then, was not simply a good model for a public dissection in Rome, and for medical learning in general: it was the ideal. A culture of edibility and a vast machinery of production would have meant not simply that *Galen* had easy access to pigs for anatomical experimentation, but that any of his potential

⁴⁵ *Ibid.*, 156.

⁴⁶ *Ibid.*, 158.

⁴⁷ *Ibid.*

⁴⁸ Mackinnon, 667.

readers — his texts are nearly *always* didactic in tone — would have been able to access them as well.

Yet to make this connection between Galen and pig consumption more than a temporally specific one, we would have to follow the pigs from Rome to Salerno. And at Salerno, in the south-central section of Italy, we discover another location where pig husbandry during and following the Roman Empire was highly developed. Archaeological evidence from nearby Pompeii confirms substantial deposits of pig bones in quantities which suggest that the Campania region, and specifically this eastern one proximate to the water, would have been ideal for pigs.⁴⁹ And though the industry itself clearly fell off following the dissolution of the Roman Empire, pigs would continue to play a growing and important role in Medieval Italian diets. In all likelihood, pigs emerged from the sacking of Italy by various “barbarian” tribes better positioned than their Roman masters. Indeed, the laboratories at Salerno would have been hard-pressed to locate a significant supply of the apes which Galen had sought to avoid maiming. Pigs, on the other hand, were undoubtedly in good supply. They were, in fact, likely “one of the most important sources of meat and fat” in large swaths of medieval Europe.⁵⁰ Because they could both roam forest areas as well as eat garbage in city streets, pigs were an ideal animal for production and consumption during medieval times. And due to “the central role the pig played in the medieval diet, it is not surprising that physicians used various parts, such as feet, gall, and lard, for a variety of remedies.”⁵¹ Equally, one could say, it is not surprising that anatomists at Salerno used pig bodies for a variety of dissections. Vesalius, teaching at the University of Padua during a period when food production was developing at a much quicker pace and remained much more stable than in the medieval period — the Renaissance was, after all, in full speed in 1540 — would have had no trouble at all accessing a large store of pigs.⁵² The thing that saved at least a number of pig bodies from the dissection scalpels of European history was not, in fact, the discovery that they were not suited to the practice or the awakening of an ethical feeling toward

⁴⁹ Ibid.

⁵⁰ Melitta Weiss Adamson, *Food In Medieval Times* (Westport, CT: Greenwood, 2004): p. 30.

⁵¹ Ibid.

⁵² Elizabeth S. Cohen and Thomas Vance Cohen, *Daily Life in Renaissance Italy* (Westport, CT: Greenwood, 2001): 228.

porcine creatures. It was, instead, the simple fact that human bodies themselves finally became morally and ethically less problematic dissection objects under and following Vesalius.

And yet Vesalius partook as well in the dissection of pigs, tapping into the standing reserve of porcine bodies that had helped anatomists before him, like his “rival” Galen and the textbook writers of Salerno. Vesalius continued a “carnivorous” form of anatomy — anatomy as we understand it, I suggest, was always already carnivorous: the practice of cutting open and breaking up animal bodies was inseparable from a relationship of edibility toward those bodies — that saw pigs in particular as, essentially, walking food. This lens, through which the early anatomists both related to and understood pigs, as animals for consumption, circumscribed the telos to any particular pig’s life: it was, or would be, eaten. Pigs were, from their earliest moments, becoming-pork: though they might serve other purposes during their lives, like cleaning streets or foraging, the end of a pig’s life was always the dinner table, in one form or another. That becoming-pork was inextricably related to the difficulty in ethically identifying with pigs that Galen expresses so clearly. Pigs were, during Roman times, and are, today, still one of the most widely and *completely* consumed animals in existence — one can and did eat almost the entirety of the pig. That their production for this purpose would increase rapidly with the growth of industrial farming was not incidentally related to their reappearance much later in history as medical and dissection model: this production and consumption was that re-emergence’s *condition of possibility*. As the rest of this paper will attempt to demonstrate, the becoming-pork of pigs maintained a privileged place in scientific discourse — becoming more explicit over time, not less. And one of the least likely but most important places for the re-emergence of the porcine body in science was the high school classroom.

Fetal Pigs, Inc.

In his review of W. J. Baumgartner’s 1924 book, *Laboratory Manual of the Foetal Pig*, H. H. Lane writes that the “laboratory manual” deserves “the consideration of every teacher of comparative vertebrate anatomy. It contains excellent directions for the dissection and study of a form hitherto largely over-looked, which presents certain obvious advantages over the dog, cat or other mammal more frequently the object of such study.”⁵³ “Foetal pigs,” importantly, were “over-looked” in 1924, which is an observation that seems strikingly anachronistic in 2013

⁵³ H. H. Lane, “Scientific Books: Laboratory Manual of the Foetal Pig. by W.J. Baumgartner,” *Science* LXI, No. 1591 (June 26, 1925): 658-659.

where laboratory dissections of fetal pigs form a central part of many high school biology curricula. Foremost — numerically and, one could wager, symbolically — among the “obvious advantages” presented by the pig is “(1) The unlimited number of specimens which may be obtained at any good-sized packing plant with a minimum expenditure of time and labor.”⁵⁴ Here, nearly a century in advance, we find an early version of the argument Bendixen and colleagues will leverage for the usefulness of pigs as model organisms: their presence at hand. For Lane (citing Baumgartner), pigs are “unlimited,” largely due to advances at the time in refrigerated transportation that allowed for the consolidation of pig production in major centers. “Centralized packing plants were located adjacent to the stockyards” in most pork industry centers, so the enterprising medical supplier could acquire a significant batch of fetal pigs with a “minimum expenditure of time and labor.”⁵⁵ According to Bendixen, in 2010 pigs are an “exceptionally large biological resource ... [thanks to] industrial pig production...”⁵⁶ In both cases, due to over-production by industrial pig farms, the *size* of the porcine standing reserve is trends toward infinity, or excess, while the *ease* of their acquisition for scientific purposes is represented as incredibly simple. For both Lane and Bendixen, the “facticity” of this reserve army of scientific pigs — the origins of and reasons for this production, its potential cancellation, factory farming itself, etc. — is taken completely for granted. As a more recent manual covering the benefits of using fetal pigs for dissection — citing Nebraska Scientific, self-billed as the “world’s largest processor of fetal pigs”⁵⁷ — suggests: “Fetal pigs are not bred for the purpose of dissection. They are a by-product of the pork food industry.”⁵⁸ This rhetorical move is meant to assuage potential guilt about the way that fetal pigs are acquired for dissection use, but it does so through precisely the same unproblematic acceptance of the industrial origins of “model pigs.” It depicts fetal pigs as the excess or waste of an industrial process that will continue ad infinitum,

⁵⁴ Ibid., 658.

⁵⁵ Mick Vann, “A History of Pigs in America” *Austin Chronicle*, April 10, 2009: <http://www.austinchronicle.com/food/2009-04-10/764573/>.

⁵⁶ Bendixen, et al. Ibid.

⁵⁷ Nebraska Scientific, “Everything You Wanted to Know About Fetal Pigs... But Didn’t Know Who to Ask,” no date. <http://www.nebraskascientific.com/wfdata/frame2200-1252/File3.pdf>.

⁵⁸ James Miller, “Why fetal pigs are good dissection specimens,” 1997. <http://www.goshen.edu/bio/pigbook/dissectionadvantages.html>.

which is to say that it relies upon the becoming-pork of pigs because industrial production of pigs will inevitably create fetal excesses.

Lane, however, continues to elucidate reasons that pigs possess utility for medical inspection *other* than simply their large, available stock. He continues his list of the advantages thus:

- (2) The convenient size of the specimens...
- (3) The absence of an objectionable odor or *other quality* that would make them objects of disgust to the *most "finicky"* student.
- (4) The impossibility of any *sentimental restrictions* on their use arising from humane societies or antivivisection societies. Related to this is the fact that the student has no tender associations to be outraged as is sometimes the case where 'pet' animals are used.
- (5) The softness of the muscular and skeletal systems in the fetal pig make easier the dissection of the nervous and circulatory systems. And finally,
- (6) The student gets a very good idea of the course of the fetal circulation in mammals.⁵⁹
(Emphasis mine)

Lane was, clearly, incapable of predicting the situation that fetal pig dissection finds itself in today: *actual* fetal pigs are being replaced by "cyber" dissections or other substitutes because "finicky" students of multiple varieties (religious, ethical, etc.) have, in fact, made these pigs into "objects of disgust";⁶⁰ and "sentimental restrictions" from "humane societies" like PETA *have* arisen.⁶¹ He was wrong on both "moral" counts. However, those later shifts — toward a more cosmopolitan lab makeup, toward a stronger animal rights lobby — were far removed from Lane's foresight, and it would be unfair to fault him for failing to anticipate PETA and cyber pigs.

The second half of point (4) and point (6), however, deserve a closer analysis. Already, in 1925, small pigs were separated from the "tender associations" that students maintained with "pet" animals: dogs, as well as cats, were the other primary dissection target at the time due to their similarity with humans. Due to increasing industrialization and their disappearance from traditional small farms, pigs had begun their transition into invisibility for the educated and

⁵⁹ Lane, 658.

⁶⁰ Even supporters of the practice have agreed that it should not be an obligatory one, see Garcia Barr and Harold Herzogl, "Fetal Pig: The High School Dissection Experience," *Society and Animals*, Volume 8, Number 1, 2000, pp. 53-69(17).

⁶¹ Their "Dissection: Lessons in Cruelty" webpage makes this point clearly.

urbane students of anatomy as well as for society at large.⁶² The fetal pig is situated, in Lane, at an entirely different level than “companion animals” or “pets,” thereby severing these entities from the complex modes of interaction that “companion animals” can provoke. The interaction between dogs and their owners, as writers like Donna Haraway have investigated, can disrupt “the absolute animal-human binary” as “pet owners ‘readily mix and match’ different interpretations of their animals as both ‘human’ and ‘animal’ ...”⁶³ For Lane and Baumgartner, pigs are, quite simply, animals — in the fully derogatory mode of the term’s deployment — and they, as well as their fetal waste by-products, can be used *ethically* as objects for medical knowledge.

Importantly, as well, it is not simply *porcine* knowledge that student dissection of a fetal pig provides but knowledge about “the course of the fetal circulation *in mammals*” (emphasis mine). The fetal pig — along with the constitution and general arrangement of its biological systems — comes to metonymically represent mammals in toto, and fetal pig bodies become sites from which knowledge about those other bodies can be extracted. The fetal pig, then, is one essential player in the creation of the “model pig.” The analogization of the pig had already reemerged powerfully in the later 1800s with the dissection of pig eyes as potentially useful for understanding the structure and function of sight in general.⁶⁴ The shift, however, in the positioning of fetal pigs as *analogically* and *physiologically* similar to humans and other mammals in their complete interior makeup went farther than simply noting the complexity of pig eyes had: the pig became a body where human physiology was reduced and where the systems of larger mammals were visible in a simplified totality — organs-without-body. And if the pig had been *understood* in this way since Vesalius, it was only around this time that the pig was re-popularized as an object of pedagogical inquiry.⁶⁵ As Franklin Mall wrote in his piece

⁶² Mizelle, 9.

⁶³ Schlich, Thomas, Eric Mykhalovskiy, and Melanie Rock. “Animals in Surgery - Surgery in Animals: Nature and Culture in Animal-Human Relationship and Modern Surgery.” *Hist. Phil. Life Sci.* 31 (2009): 1–35.

⁶⁴ For example, in Veasey (1896): “For use in practicing the various operations, the pig’s eyes seem to be the best.” Clarence Archibald Veasey, *Ophthalmic operations as practiced on animals’ eyes* (Philadelphia: Edwards & Docker Co., 1896). In Edwards (1923): “Pigs’ eyes may be easily obtained from a slaughter house.” Edwards, H W. “A Look Into One’s Eye.” *School Science and Mathematics* (1923).

⁶⁵ Why the pig disappeared from this position is a question large enough to merit more substantial consideration elsewhere.

“On the Teaching of Anatomy,” the use of a pig would help resolve that “difficulty [whereby] a system, e. g., the digestive, is treated as a whole by having each student dissect it rapidly in a fetal pig. That which is studied in regions in the dissecting room is here *studied as a whole*.”⁶⁶ The introduction and popularization of fetal pig dissection is thus an integral moment in an effort at comparing pig “bodies” to human ones — though this had occurred in Galen’s time, as we have seen. What was new here? The answer, I think, is the attempt to miniaturize human systems and force them to appear in the dissected pig so that they could be seen “as a whole.” Thus, the dissector of a fetal pig comes to understand that pigs are *biologically like us* on not simply the level of organ comparison, but from a systems perspective as well.

One might expect that this similarity would arouse *more* sympathy on the part of the dissector, which is why the importance of the “impossibility of sentimental restrictions” and “tender associations” is stressed in Lane and Baumgartner. Pigs are thus placed in a paradoxical relation whereby they are simultaneously *biologically like us* and *morally valueless* — a way of occupying both sides of the animal-human boundary simultaneously (while maintaining the barrier of the middle), a *pharmakos/pharmakon*⁶⁷ of animality. This divergent juxtaposition (or, comparadoxicality) of pigs and humans finds some of its earliest justifications precisely in the anatomical manuals on pig dissection. As a 1965 lab manual for dissecting fetal pigs in college labs writes:

The purpose of a study in Anatomy is to acquaint you with the structure of the mammalian body, that is, your own. Any number of different animals might be used for this purpose, but the fetal pig combines a number of advantages which make it ideal for use in the laboratory — it is abundant, convenient in size and thus easily handled, relatively inexpensive and, in addition, serves to illustrate fetal structures as well as most of those which will be present in the adult.⁶⁸

The phrase “any number . . . might be used” is a rhetorical trope that emerges repeatedly throughout scientific literature justifying pig use: initially, it is established that the pig is not exactly *necessary* for learning, research, etc. Instead, the pig is *sufficient* because of a series of advantages established by cost-benefit calculation against a non-present alternative animal

⁶⁶ Mall, Franklin P. “On the Teaching of Anatomy.” *The Anatomical Record* 2, no. 8 (November 1908): 1–23.

⁶⁷ The *pharmakos* was sacrificed in Ancient Athens during times of hardship. In Greek, *pharmakon* connoted simultaneously poison and cure.

model. Like Lane, Odlaug deploys the vastness of the porcine standing reserve: the fetal pig is “abundant” and “relatively inexpensive,” as well as manageable and representative of “the mammalian body.” The fetal pig was a critical instance of the conversion of the “pig” into an item of advanced medical understanding not by inaugurating its use — that had happened already — by *routinizing* the pig: dissection of pig eyes was primarily undertaken by medical students, and eventually it would filter into high school classrooms. The availability, the dissectability of the pig became something non-specialized individuals were aware of and, as Theodore Adorno writes, “Representation gives way to universal fungibility. An atom is smashed not as a representative but as a specimen of matter, and the rabbit suffering the torment of the laboratory is seen not as a representative but, mistakenly, as a mere exemplar.”⁶⁹ The pig maintained its status, from Galen to now, as a “mere exemplar,” mere organs-without-body, for “the mammalian body” more generally.

And if the “availability” and “palatability” of the fetal pig as the object of student medical dissection was conditioned by industrial production of the pig, it was also haunted by what I described above as a “carnivorous” anatomy. As Odlaug writes in the manual, “Bear in mind that you are dissecting, not butchering.”⁷⁰ His instruction is obviously meant to ward off unnecessary destruction to the entity being dissected, but it cannot escape the familiarity with pork consumption that most of Odlaug’s prospective students would have possessed. It is a nearly inescapable conclusion in the American context that the conditions of possibility for dissecting fetal pigs was, in fact, factories producing pork for human consumption. The pork industry grew rapidly in America following the 1950s due to relaxed government regulations and heavy subsidies.⁷¹ Yet in 1906 the American pork slaughterhouses were already operating at a ferocious pace, enough to provoke Upton Sinclair’s musing in *The Jungle*:

One could not stand and watch very long without becoming philosophical, without beginning to deal in symbols and similes, and to hear the hog squeal of the universe. Was

⁶⁸ Theron O. Odlaug, *Laboratory Anatomy of the Fetal Pig, Fourth Edition* (Dubuque, IA: WM. C. Brown Company Publishers, 1969): p. 1.

⁶⁹ Theodore Adorno and Max Horkheimer, *Dialectic of Enlightenment* (Stanford: Stanford University Press, 2004): p. 7.

⁷⁰ *Ibid.*, 37.

⁷¹ Mizelle, 77.

it permitted to believe that there was nowhere upon the earth, or above the earth, a heaven for hogs, where they were requited for all this suffering?⁷²

Though Lane also lays out a series of potential disadvantages, they remain “biological,” rather than “deal[ing] in symbols and similes”: the pigs become too mushy, their muscular systems are strange, etc. Nonetheless, in Lane’s calculations, “The disadvantage is after all such a minor one that it is far outweighed by the greater usefulness of the pig in all other aspects.”⁷³ After noting a few spelling errors — Lane finds Baumgartner’s use of “foeti” instead of “fetus” problematic both for the anachronicity of the “oe” and for its improper Latin pluralization (“-i” instead of “-us”) — he concludes that “Baumgartner... makes available for [comparative anatomy teacher’s] use a form the availability of which has not been so widely realized as it deserves.”⁷⁴ Though Lane saw Baumgartner’s book primarily as a pedagogical advance, it was also doing something much more significant: inaugurating and seizing a new space for the “model” pig in scientific discourse and scientific space.

Yet it went farther, because the existence of little pigs in dissection rooms was hardly a historical revelation, even if it had vanished in importance for a time. The growing utility of educational fetal pigs also plays an integral role in the conversion of pigs into scientific commodities, where before there was mere cooperation between pig production companies and laboratories. It is no wonder, as well, that multiple companies very quickly appear on the scene to profit from the distribution and marketing of “fetal pigs” as a product sold for dissection labs — Nebraska Scientific, et al. The pigs were abundant, cheap, and easily handled, which meant they were also easily circulated and sold, as well as easily inserted into already existent channels of scientific transfer. The “waste” of a rapidly expanding industry, rather than simply being thrown away, could be *recycled* and *reintroduced* back into chains of circulation. As James Miller writes in his section covering “Why fetal pigs,” “Those that are not used for education will be used for fertilizer production or discarded.”⁷⁵ And so, instead of being simply “discarded,” they could be re-marketed as educational products. This fits a much larger trend in the development of markets in what Zygmunt Bauman has called “liquid modernity,” in which “nothing dies, nothing disappears for good; no waste can be disposed of radically and

⁷² Upton Sinclair, *The Jungle* (E-books Directory, 1906): unpaginated.

⁷³ Lane, 658.

⁷⁴ Ibid.

⁷⁵ Miller, “Why fetal pigs.”

completely, it can only be recycled.”⁷⁶ The “fetal pig” — the commodity, not simply the body to be dissected — is the object by which industry continues to recycle its waste. “Capital sees waste as the final frontier for commodification,”⁷⁷ suggests Todd McGowan, and the fetal pig becomes a converted waste-commodity in the “unlimited” quantities that Lane describes. The “fetal pig” is the *final frontier* for a carnivorous anatomy, the echoes of which we have traced at multiple points in history. The edibility of pigs, their becoming-pork establishes a social world in which porcine mass production is an inevitability: that over-production inevitably produces its own excesses. And, reversing the previous statement, that excess would be impossible without the over-production of pigs for consumption. With the “fetal pig,” porcine excesses could be utilized, continuing the cultural tendency to use as much of the pig as possible. Here, consumption by mouths is offloaded to science by placing fetal pigs in explicitly anatomo-scientific channels, re-branding those pigs. They will be used — the only questions are *by whom* and *for what?* Yet even this re-commodification of porcine refuse necessarily entails its own waste: after all, something has to be done with the dissected fetal pigs (bodies-without-organs, again)... As Bauman says, “recycling of waste is in itself a waste-producing process.”⁷⁸

The fetal pig was an important bridge between the pork industry and science, a connection that would become more explicit later on. In fetal pigs, industrial trash became scientific treasure, commodified and marketed as an educational product. Thus, the “fetal pig” helped ensure that biology classrooms around America would be places, not where the “hog squeal of the universe” is finally heard, but where the cold bodies of porcine waste produced by an infinitely expanding industrial pork industry would be opened up to “acquaint” us with “our own” bodies.⁷⁹ Because, after all, “Most people do not think of pigs as ‘pets’.”⁸⁰ If industrial production of pig bodies for science was a natural development from a sprawling industry, then we might also not be surprised that the process would be inverted: the production of pig bodies for science (and industry) *by* science itself.

We Have Never Been Sentimental

⁷⁶ Zygmunt Bauman, *Forget Baudrillard?* (New York: Routledge, 1993): p. 39.

⁷⁷ Todd McGowan, “The Obsolescence of Mystery and the Accumulation of Waste in Don DeLillo's *Underworld*.” *Critique: Studies in Contemporary Fiction* 46, no. 2 (2005): 123–145.

⁷⁸ Bauman, 39.

⁷⁹ Odlaug, 1.

David C. England spent World War II as a Naval pharmacist's mate in New Caledonia.⁸¹ Returning to civilian life, he earned a bachelor's degree with distinction from Washington State and later M.S. and Ph.D. degrees, "majoring in animal breeding and genetics" at the University of Minnesota.⁸² England quickly became attached to the Hormel Institute at the University of Minnesota, Austin. His work at Hormel focused on the development of a new organism ideal for medical research: the Minnesota Miniature Swine. The Minnesota minipig was one of the earliest miniature pigs designed explicitly for scientific inquiry. The minipig was a response to the growing realization, beginning roughly in the 1940s, that pigs were a useful object for scientific inquiry: "The advantages of small pigs, [included] the ease of handling, the decreased requirements for food and space, and the lower amounts of pharmacological products and anaesthetics needed in the studies..."⁸³ In a preliminary report announcing their progress in producing such a creature, England and colleagues suggest that the "specific objects" of their project are to "produce" a "laboratory animal" that is "prolific and easily handled... which anatomically and physiologically closely resembles human beings."⁸⁴ This "laboratory animal" would ideally "be susceptible to disease agents" and would be "useful in a wide variety of laboratory research."⁸⁵ The first successful Minnesota Miniature Swine created quite a stir, not simply in the scientific world: the Hormel Institute earned a LIFE magazine article heralding this pig breakthrough. The LIFE writers described minipigs as "ideal for medical research."⁸⁶ Minipigs resolved a difficulty that regular swine presented to scientific research: though their internal similarities to humans warranted medical consideration, handling a heavy pig was no simple task for even well-equipped laboratories, especially because pigs were happiest and most

⁸⁰ Miller, "Why fetal pigs."

⁸¹ J. E. Oldfield, "David C. England, 1922–2001: A brief biography" American Society of Animal Science, April 20, 2001, <http://www.asas.org/docs/publications/england.pdf?sfvrsn=0>: 1.

⁸² Ibid., 1.

⁸³ Friederike Köhn, "History and Development of Miniature, Micro- and Minipigs" in *The Minipig in Biomedical Research*: p. 6.

⁸⁴ David C England, Laurence M Winters, and Lawrence E Carpenter. "The Development of a Breed of Miniature Swine -- a Preliminary Report." *Growth* 18 (1954): 207.

⁸⁵ Ibid.

⁸⁶ LIFE Magazine, "Mini-pigs for biomedical research," November 29, 1954: p. 83.

stable in large social groups. Unlike “the pig” qua industrial stock, “no matter how much corn he eats the little pig above will never grow up to be a big hog.”⁸⁷

There was one further benefit to developing miniature *pigs* for scientific research rather than dogs, monkeys, or other animals that shared anatomical and biological similarities to humans. As the LIFE magazine author cheekily points out at the article’s conclusion, “practically nobody is sentimental about pigs.”⁸⁸ We have traversed nearly a thousand years of anatomical investigation of porcine bodies and, while many factors about that relationship changed, one thing remained relatively static, from Galen’s insistence that pigs lacked the “loathesomeness of expression,” to Lane’s claim that pigs had “no tender associations,” and finally to LIFE magazine’s suggestion that “nobody is sentimental about pigs.” It seems, to remix slightly Bruno Latour’s phrase,⁸⁹ “We have never been sentimental” — if “we” is understood to highlight a connective tissue between these different moments in anatomical and biological history, rather than to suggest they formed a cohesive, continuous narrative. And yet for many Americans, the idea that there is no sentimental relationship toward pigs would seem highly inaccurate: look at state fairs, look at Babe! Or, perhaps, we might look at Arnold Ziffel.

Introduced in 1965 to the popular television situational comedy, *Green Acres*, Arnold Ziffel is a highly intelligent pig who can do nearly anything that a human can: paint, play piano, watch television, etc. Arnold, the boy pig, was likely played by a female pig. Female pigs were smaller and tended to be slightly easier to manage. Arnold Ziffel captured the public’s attention, winning multiple awards for animal acting. He was the first pig to be centrally portrayed in a mass media venue such as this, and he was explicitly “humanized” throughout the run of *Green Acres*: much of the “humor” of Arnold Ziffel is the frequency with which he does things that *only humans can do*, like joining the U.S. Army or delivering newspapers. The joke exists in the *irony* of the situation: the urbane spectator of a television drama in 1965, four years before Odlaug’s lab manual, would have related to pigs mostly through their status as pork. And, indeed, despite his success, Arnold Ziffel could not escape the pull of becoming-pork. A popular rumor, denied by the show’s producers and “Arnold’s” trainer, during the height of *Green Acres*’

⁸⁷ Ibid.

⁸⁸ Ibid.

⁸⁹ Bruno Latour, *We Have Never Been Modern* (Cambridge: Harvard University Press, 1993).

popularity was that the cast frequently dined on Arnold.⁹⁰ Arnold was haunted by the cultural association of pigs and pork, of what I have called the “edibility” of pigs in the cultural imaginary. Indeed, “One storyline had Arnold inheriting millions of dollars as the sole descendant of the favorite pig of a pork-packing magnate, distinguished by his ability to predict the weather with his tail.”⁹¹ That a pork-packing magnate might possess a “favorite pig” plays on the disposability that the majority of industrial pigs possessed then, and now. Upton Sinclair’s description of the horrors of a mass production pork factory was hardly an isolated experience.

Thus, Arnold Ziffel possessed a paradoxical liminality similar to that of the dissected fetal pigs, but his was dramatized due to his explicitly human *behaviors* and not simply his internal biological makeup: Arnold was simultaneously a human-pig and pig-meat, two divergent trajectories united in a single body. And Arnold’s influence was not circumscribed to *Green Acres*. He would have a serious influence on the “pigs” that circulated in the American culture imaginary ever since: “The 1995 theatrical film *Gordy* was originally conceived in the early 1970s by Green Acres creator Jay Sommers and writer Dick Chevillat as a vehicle for the Arnold Ziffel character.”⁹² But Arnold’s edibility and disposability, and that of the other famous pigs, would never entirely escape them. That Porky, the most famous cartoon pig, possesses a name derived explicitly for his relationship to pig consumption is unsurprising, regardless of, and perhaps even due to, his popularity. But despite their humanization and their favor in the cultural eye, pigs could not escape their connections to mass, industrial availability, to their becoming-pork. That Wilbur and Babe, two of literature’s most famous and adored pigs were both saved from slaughter confirms this connection. The famous pigs were *saved from* the inevitable course of their lives, their becoming-pork

In Quentin Tarantino’s *Pulp Fiction*, Vincent and Jules debate why Jules refuses to eat bacon. As Jules says, “Pigs are filthy animals. I don’t eat filthy animals.” Vincent retorts that dogs are also filthy animals, “But,” Jules declares, “a dog’s got personality. Personality goes a long way.”

⁹⁰ see Snopes, “Pork and Screens” <http://www.snopes.com/radiotv/tv/ziffel.asp> (accessed May 15, 2013). Similar rumors would emerge about Babe.

⁹¹ see Wikipedia, “Arnold Ziffel,” Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/w/index.php?title=Arnold_Ziffel&oldid=514872670 (accessed May 15, 2013).

⁹² Ibid.

Vincent: “Ah, so by that rationale, if a pig had a better personality, he would cease to be a filthy animal. Is that true?”

Jules: “Well we'd have to be talkin' about one charming motherfuckin' pig. I mean he'd have to be ten times more charmin' than that Arnold on *Green Acres*, you know what I'm sayin'?”⁹³

Ten times more charming than Arnold, the pig would have to essentially *be* human to escape its connotations of filth and disposability, its status as *trash*. But how do these cultural pigs connect to the laboratory ones that we have focused on? More obviously than expected, the answer is Arnold Ziffel, who was “perhaps The [Hormel] Institute’s most famous contribution”: the Institute provided all of the pigs who would cycle through roles as Arnold Ziffel.⁹⁴ The “type” of pig used for Arnold is difficult to discover, even from the various *Green Acres* fan sites scattered around the net, but there is one highly likely answer: the Hormel Institute donated *extra* young pigs that its research did not require. The Institute would have possessed a series of different kinds of pigs for its porcine research generally, but particularly because the minipig research required multiple different species of swine that could be combined together to create an artificially smaller organism.⁹⁵ Thus, this time the excesses of science made their way back into the public and into industry (the culture one): Adorno’s “mere exemplars” became, temporarily, true “representatives.” And the “minipig” was, from its beginnings, connected to industry-focused research carried out by the Hormel Institute. As England writes about the initial miniature swine research, “This project is envisioned as a further test of the effectiveness of the flexible systems of inbreeding and selection used in producing the Minnesota No. 1 and Minnesota No. 2 breeds of ordinary-sized swine.”⁹⁶ The Minnesota No. 1 and No. 2 pigs were celebrated a mere five years before for “revolutioniz[ing] the whole pig business, applying scientific methods over a long period of years... They’ve produced one complete new streamlined brand of swins (sic)...”⁹⁷

⁹³ Samuel Jackson and John Travolta, *Pulp Fiction*, Film, directed by Quentin Tarantino (1994; USA: A Band Apart.), Blu-Ray.

⁹⁴ Ann M. Bode, “In Pursuit of a Cure: Searching for Food-Based Cancer Therapies and Preventions at The Hormel Institute,” *Rural Minnesota Journal*, Vol. 4 (2009): p. 109.

⁹⁵ England et al., 207.

⁹⁶ *Ibid.*

⁹⁷ Reading Eagle, “Streamlined Pigs Are Produced By Applying Scientific Methods,” August 15, 1949: online.

A frequent suggestion by those who study pigs is that people do not really understand “what pigs are”: we think of the light pink, chubby and cute farm creatures like Babe or Arnold rather than the vast variety of pigs that exist around the globe. One result of the above discussion seems inescapable, however, and it is this: science played an *integral* role in shaping what sorts of pigs Americans think of when they think of pigs. Science provided exemplars: Arnold was a famous one, but so too was “Pig No. 311,” the miraculous survivor of United States military radiation testing.⁹⁸ And though funding for Hormel Institute’s minipig research would eventually dry up, “Dr. Tumbleson of the Sinclair Comparative Medicine Research Farm” would acquire a breeding stock and take it elsewhere: the Minnesota Miniature Swine was relocated and re-named the Sinclair Miniature Swine in Missouri. This Minnesota pig became the “foundation” line for the “Nebraska, Göttingen, FDA Hormel-Hanford, NIH Minipig, [and] Minipig of Czech Republic.”⁹⁹ The Hanford minipig, developed in Washington at the Hanford National Laboratory, close to where David. C. England had relocated after his work in Minnesota, would be central to a series of studies by the National Institute of Health and radiological studies by the Atomic Energy Commission.¹⁰⁰ England, who was one of the more famous experts on the science of minipigs, served as president of the Western Section of the American Society of Animal Science in 1975 and was well regarded for his expertise — even by “the Oregon Pork Producers’ Association, which honored him with its distinguished service award.”¹⁰¹ L. M. Winters, co-author on England’s minipigs paper, was recognized by “the Federal Reserve Bank of Minneapolis” for these wondrous new swine. Winters, for his part, argued that “this was and is a research project... not a demonstration nor a promotion,”¹⁰² but back in 1924, when the project began, he did not hesitate to suggest that the goal of this research was to improve the “merit of the product.”¹⁰³ The “merit” was great, because No. 1 hogs contained a “larger proportion of the higher-priced cuts of meat” than any of their “natural” predecessors, which packers “praised.”¹⁰⁴ The doorway between pork and scientific pigs, it seems, remained open.

⁹⁸ “This Little Pig Came Home.” *Time*, April 11, 1949.

⁹⁹ *The Minipig in Biomedical Research*

¹⁰⁰ Köhn, 10.

¹⁰¹ Oldfield, 1.

¹⁰² *Reading Eagle*, online.

¹⁰³ *Ibid.*

¹⁰⁴ *Ibid.*

The minipig was perfect for science because of its similarity to humans while avoiding the “sentimentality” that companion animals in lab settings, like dogs or monkeys, could provoke. As two scientists at the Göttingen Minipig laboratory write recently, there is an “ethical” benefit to using pigs — specifically minipigs — as medical models because “the use of non-rodent species as primates and dogs in biomedical research is confronted with an increasing resistance from society. The pig is an advantageous alternative species, since it is accepted by society as a *production animal* and thus has a lower emotional merit.”¹⁰⁵ [Emphasis mine] We have seen this logic repeated throughout, but what this paper has articulated as well, I hope, is the growing explicitness with which the production imperative of the industrial pork industry justified the scientific use of medical pigs and the increasing ability of science to produce, as well, its own supply of porcine bodies, tailored to specific experimental pursuits. Bollen and Ellegaard’s rhetoric here is an especially sanitized version of what we have seen up to this point: the pig now simply does not “deserve” emotional response as much. With the minipig, the explicit meddling in pig genetics and anatomy becomes a scientific standard, which is “ethically” acceptable because of pigs’ “lower emotional merit.” Scientists can ethically meddle with pigs however they want. And thus, when Bendixen and colleagues write in 2010 about the massive industrial availability of the scientific porcine standing reserve waiting to be converted into the new medical model for human diseases of various sorts, we are, at this point, rather desensitized to such scientific rhetoric.

If minipigs seemed to transition logically into the medical models that pigs are increasingly projected to become, that projection is marked by hesitations and uncertainties about how *similar* pigs really are to humans. Scientific research on pigs is growing in popularity, particularly in the United States, where “NIH-sponsored research (over 20 institutes and centers) supported over 2,500 separate grants using the pig.”¹⁰⁶ One central area of this research is in organ transplantation of pig organs into human bodies, in part as a response to the growing “crisis” in organ availability and the neoliberal need for fresh markets of organs.¹⁰⁷ As Nancy

¹⁰⁵ Peter Bollen and Lars Ellegaard, “The Göttingen Minipig in Pharmacology and Toxicology,” *Pharmacology & Toxicology*, Vol. 80, Issue Supplement s2 (1997): p. 3.

¹⁰⁶ Beattie et al., “Swine in Biomedical Research: Creating The Building Blocks Of Animal Models,” *Animal Biotechnology*, Vol. 16 (2005): p. 184.

¹⁰⁷ Nancy Scheper-Hughes. “The Last Commodity: Post-Human Ethics and the Global Traffic in ‘Fresh’ Organs.” 1–14, Blackwell Publishing (2005): 150.

Scheper-Hughes has pointed out, “A new source of organ scarcity is, however, being socially produced by the artificial expansion of organs waiting lists in North America and Europe” which are “inflating the demand for organs and promoting desperate means to obtain them.”¹⁰⁸ One possible answer to the growth of “organ tourism” and what Scheper-Hughes calls “grey” markets for organs is, from the mouth of the medical community itself, the possibility of harvesting organs from pigs. “In the 10 years that have elapsed since the previous Swine in Biomedical Science Conference,” announces Beattie and his colleagues, “tremendous technological advances now support xenotransplantation of pig organs into humans.”¹⁰⁹ If Scheper-Hughes worries that the artificially constructed “waiting lists” are pushing to more desperate forms of human harvesting, they are equally propping up efforts by scientists to convert pigs into suitable bodies for organ harvesting. The porcine body “remains the front-runner as a potential xenobiotic source of many organs, while thousands of patients die each year in this country waiting for a histocompatible donor.”¹¹⁰ Even the conventionally conservative Vatican has thrown limited support behind xenotransplantation — particularly from porcine donors.¹¹¹

The problem, however, is not as simple as *acquiring* the pigs. Both “cloned pigs” and “miniature pigs” are widely available, and the development of the minipig and the increasing interest in pigs as a site for xenotransplantation of organs into human bodies are intricately related issues, as a conference presentation in 2005 suggested. The presentation demonstrated “how difficult it is to separate the development of pig lines for xenotransplantation without considering the remarkable progress made in genetic modification and cloning of pigs.”¹¹² The production of large quantities of model pigs produced not simply an available stock of porcine models, but a *knowledge base* about pigs in general that has produced essential for the development of xenotransplantation. Even with this knowledge, Jeffery Sachs and his colleagues at Harvard have only very recently managed to extend “the functional viability of pig xenografts in baboons beyond two months.”¹¹³ A complete and successful organ transplant between a human and pig remains, for the moment, out of sight, with a disturbing history of failures

¹⁰⁸ Ibid., 154.

¹⁰⁹ Beattie et al., 187.

¹¹⁰ Ibid.

¹¹¹ Basil Cole, ““Prospects for Xenotransplantation”: A Brief Overview,” *The National Catholic Bioethics Quarterly*, Volume 2, Number 3 (2002): 391 - 397.

¹¹² Beattie et al., 187.

haunting any future progress: a failed heart transplant into a small child known as “Baby Fae” in 1984, a failed heart transplant by a Polish doctor in 1992.¹¹⁴ As a United Kingdom Xenotransplantation Regulatory Authority report in 2001 argued, “on the basis of current evidence, whole-organ xenotransplantation, as a solution to the ongoing shortage of organs for transplant, appears to be some way off.”¹¹⁵

Beyond simply getting the pigs, one has to effectively “humanize” and “de-pig” the pig, and it is this step which has managed to so far baffle xenotransplantation scientists. The process requires creating “knockout” organs where certain genes that might otherwise signal the “porcinity” of the organ are removed. The central question of organ transplantation is “avoidance of organ rejection,” and the solution is “to humanize pig organs ... by genetic modifications.”¹¹⁶ Scientists have even managed to create pigs “with multiple genetic modifications, i.e. more than one gene knocked out.”¹¹⁷ How many genes *have* to be knocked out? How many *can* be? The specter haunting these questions of transplant effectiveness is chimerism: the chimera, the “fire-breathing female monster with a lion's head, a goat's body, and a serpent's tail,”¹¹⁸ as well as chimerism, proper, the genetic state of possessing two genetically distinct cells. The organ transplant surgeon and scientist must understand his very work as *chimeric* and the experience of receiving such a transplant would surely, also, be a type of chimerism.¹¹⁹ To create organ “tolerance” requires the creation of chimeras.¹²⁰ As Jean-Luc Nancy wrote, discussing his own heart surgery, the experience of chimerism “resides in a double strangeness” with “this grafted heart, which the organism identifies and attacks as being a stranger, and... the state in which medication renders the grafter in order to protect him.... It thereby makes him a stranger to

¹¹³ Ibid., 186.

¹¹⁴ PBS Frontline, “A History of Xeno Experiments,” <http://www.pbs.org/wgbh/pages/frontline/shows/organfarm/etc/cron.html>.

¹¹⁵ Ibid.

¹¹⁶ Bendixen et al., 214.

¹¹⁷ Ibid.

¹¹⁸ New Oxford American Dictionary, “Chimera.”

¹¹⁹ Starzl, Thomas E, Anthony J Demetris, Noriko Murase, Luis Valdivia, Angus W Thomson, John Fung, and Abdul S Rao. “The Future of Transplantation: with Particular Reference to Chimerism and Xenotransplantation.” *Transplant Proc.* 29, no. 1 (1997): 19–27.

¹²⁰ Yamada et al., “Pigs as Xenogeneic Donors.” *Transplantation Reviews* 19, no. 3 (June 2005): 174. doi:10.1016/j.trre.2005.10.004.

himself, to this immunitary identity, which is akin to his physiological signature.”¹²¹ And yet this “strangeness” is only in the context of a strange *human* heart in a strange human body. What does receiving the heart of a porcine being do? As Yamada and colleagues caution, “Psychosocially, the patients would have to have the support necessary and be sufficiently responsible to handle the required immunosuppressive regimen.... they should receive counseling regarding any emotional issues that develop as a result of receiving xenogeneic organs.”¹²²

This process of “humanizing” or “de-pigging” pig organs sits uneasily as the apotheosis of the porcine conversion to “organs-without-bodies”: humanizing the pig removes from the pig even the *genetic* indicators of its porcine status; the skin, I have already suggested, was done away with long ago. What, then, are these “knockout” minipigs walking around scientific laboratories, the stepping stones toward an infinite organ bank to fill our drastically growing need? The same pig bodies with different organs, or completely different bodies? “Even when taken as a body without organs,” writes Jean-Luc Nancy, the body “still has a hundred organs, each of which pulls and disorganizes the whole, which can no longer manage to be totalized.”¹²³ The de-pigging of pigs, the humanizing of pigs, the pigging of humans: clearly all of these mark a scientific (non)realization that the body “can no longer manage to be totalized,” with organs of all kinds moving, straining, pulling in so many different directions. The problem, scientifically, with xenotransplantation is that pig organs pull elsewhere than human organs, that human organs push away pig organs: the failures of xenotransplantation were violent realizations of the non-totality of the body. The chimera falls apart at its seams, like the body of a poorly sewn cloth doll, which was never as well tied as centuries of discourses on the body would have us believe. In the haphazard circulation of organs between bodies, “Man becomes what he is: the most terrifying and the most troubling technician... who denatures and remakes nature, who recreates creation, who brings it out of nothing and, perhaps, leads it back to nothing. One capable of origin and end.”¹²⁴

¹²¹ Jean-Luc Nancy, “The Intruder” in *Corpus* (New York: Fordham University Press, 2008): p. 167.

¹²² Yamada et al., 173.

¹²³ Jean-Luc Nancy, “Fifty-eight Indices on the Body,” in *Corpus* (New York: Fordham University Press, 2008): p. 155.

¹²⁴ Nancy, “Intruder,” 170.

Is the transplanted pig organ, assuming it could avoid rejection by the “human” body, still porcine? What is the status of “human” bodies that, according to the more optimistic xenotransplantation scientists, will be increasingly full of these “knockout” organs? Do porcine xenotransplants de-pig the pig or *re-pig* the human? In part due to xenotransplantation, something like Donna Haraway’s “cyborg” is increasingly coming to mark the horizon of what the human could and will become: a type of organ “vampirism” making use of a standing reserve of pig bodies that has always been there, waiting for new scientific uses to direct it.¹²⁵ Xenotransplantation is still a consumption of pig parts but one with a different mode of ingestion. While becoming-pork defined pig bodies, allowing certain offshoots to “escape” into scientific laboratories, and while it may still circumscribe the telos of pig life in the cultural imaginary — in the life of nearly every famous pig, the only end is the human dinner plate, with Alfred Ziffel remaining exempt — there is increasingly, as well, a populations of pigs that are ever more perfect organs-without-bodies. And this population is losing the genetic “definition” of its porcinity, as the pig genome is cracked and “read” in order to be better subverted.¹²⁶ But to “knockout” certain genetic information is, in some sense, akin to Robert Rauschenberg’s “Erased de Kooning”: something remains behind, a trace of the previous state, and the frame and trimmings gesture toward that previous existence. There is still a “porcinity” to the pig which *cannot* be humanized, a fugitivity the constantly strains against all attempts to knock it out. When we see a minipig, one cannot help but think of Babe and Alfred, and of Porky too: of a fugitive sentimentality that never quite disappeared. There is still something piggish about knockout pigs. And rather than view this relationship in the uni-directional mode that this essay has so far presented it, we could say that pigs have been infecting us, affecting us in ways that are becoming clear in the inability to make pigs *work* for humans as the sites of organ harvesting. When pig organs *fight back* against human bodies by refusing their assimilation: insisting on remaining strangers. Consumption of pigs has shaped the history of anatomy and biology in profound ways, which has been a central point of this essay, and pigs have played a central role as both objects and *subjects* of that carnivorous science. Their “edibility” made them not simply

¹²⁵ Donna Haraway, “Universal Donors in a Vampire Culture: It’s All in the Family: Biological Kinship Categories in the Twentieth-Century United States.” In *Uncommon Ground*, 1–24, 1996.

¹²⁶ Lily E. Kay, “In the Beginning Was the Word? the Genetic Code and the Book of Life,” in *The Science Studies Reader* (New York: Routledge, 2006): pp. 224–233.

objects of scientific inquiry, but agents that science had to enlist for best results. This is perhaps becoming increasingly clear in recent scientific realizations that experimental subjects *need* comfortable, social lives — the Göttingen labs promise that their pigs get to play with toys — in order to produce the best experimental results. If pigs in some sense *chose* domestication, they have also forced the scientist's hand in how their scientific habitats would be constructed.

In his first published short story, “Beyond Lies the Wub,” Philip K Dick tells of a spaceship crew that takes aboard an alien, pig-like creature called a “wub.” The captain of the ship is diverted from his original plan to cook the wub by a sudden discovery: not only can the wub speak, but it can read human minds. In response, the wub suggests, “You spoke of dining on me. The taste, I am told, is good. A little fatty, but tender. But how can any lasting contact be established between your people and mine if you resort to such barbaric attitudes? Eat me? Rather you should discuss questions with me, philosophy, the arts—”¹²⁷ The captain refuses, but one of the other men aboard the ship discusses philosophy with the wub, specifically the myth of Odysseus. The wub finds “in your Odysseus a figure common to the mythology of most self-conscious races,” but before he explain much farther, the captain interrupts: the wub will be eaten and even the sympathetic members of the crew make only subtle pleas over licked lips. As the wub muses, moments before its corporeal demise, “Apparently, your scientific hierarchy is not equipped to solve moral, ethical—,” but it is once again cut off before concluding the thought. The supposedly “higher” human beings are utterly incapable of appreciating the depth of intellectual capacity — and similarity — between the wub and the humans, even as the raw capacity of their scientific prowess increases. And this situation mirrors, almost precisely, the one that pigs seem to find themselves in today: even as humans increasingly understand porcine cognitive and social capacities to be higher than ever expected, pigs are restricted due to their *edibility*, their becoming-pork. After the wub is murdered, the narrator notes that “The taste was excellent.”¹²⁸ After the wub is consumed, the captain turns to Peterson, the crew-member who conversed with the wub about philosophy, and begins, “As I was saying before I was interrupted, the role of Odysseus in the myths...” The wub, rather than simply being *consumed*, commandeers something in the mind of the captain for itself.

¹²⁷ Philip K. Dick, “Beyond Lies the Wub,” in *Planet Stories* (Project Gutenberg, 1952, 2009): <http://www.gutenberg.org/files/28554/28554-h/28554-h.htm>.

¹²⁸ Ibid.

What Dick's story points out is the profound capacity for eating to transform both the consumer and the animal/object of consumption. Peter Sloterdijk has noted the importance of not simply what is consumed but of *where* humans are positioned in the consumptive act. For Sloterdijk, "all oral truth is based on the differentiation of tables. In order to be adequately complete human beings, we must learn at which tables we are the eaters and at which we become the eaten. The tables at which we eat are called dining tables; those at which we are eaten are called altars."¹²⁹ In the pig-human relationship, the situation has been maintained at relatively stable levels: pigs go *on* dining tables, *on* altars; humans sit *at* dining tables, sacrifice pigs *at* altars. Pigs get their revenge each year when an unlucky farmer stumbles in his pig sty. With the wub, the "dining table" qua decider of human adequacy is frustrated: the wub consumes the mind of the captain, even as its body is digested. Pigs have, in many ways, formed a hegemonic grasp over human minds through a long history of interaction, and a major part of that has occurred on a different sort of table: the anatomo-surgical one.

We can plot a provisional end to this expedition, which has already generated more leads, more lines of flight, than it could possibly follow, with Yann Martel's short story, "We Ate the Children Last." More clearly than almost any theoretical or scientific texts, Martel places on the table the conceptual ambiguities and psychic disturbances that xenotransplantation brings, while uniting the themes that this essay has engaged with. "We Ate the Children Last" begins with the first successful transfer of a pig organ into a man suffering from severe colon cancer. Despite all odds, "His recovery was astounding. Two days after the operation, he ate six lunch meals in one sitting."¹³⁰ His French doctors celebrate: the first successful xenotransplant used the digestive organs of the pig and placed them into the man. And not only did he survive, but his condition improved miraculously. There was one, however, side-effect: "Patient D rapidly came to dislike sweet dishes, then spicy ones, then cooked food altogether." Though his health improved, the later checkups by doctors and nurses found that the man, Patient D, now kept no food in his apartment and preferred to scavenge each night for the garbage surrounding his apartment. This transplant recipient, like the pigs who "donated" organs to him, becomes a vigorous consumer of garbage. The xenotransplant soon extends beyond its medical uses and becomes the new "chic"

¹²⁹ Peter Sloterdijk, *Bubbles* (New York: Semiotext(e), 2012): 523.

¹³⁰ Yann Martel, "We Ate the Children Last," July 16, 2004:
<http://www.guardian.co.uk/books/2004/jul/17/originalwriting.fiction4>.

form of life-improving surgery, with “the young and the bohemian, the chic and the radical, among all those who wanted a change in their lives.”¹³¹ The social effects of its growing popularization are astounding, but:

Little was made at the time of a report by the Société protectrice des animaux on the surprising drop in the number of stray cats and dogs. Garbage became a sought-after commodity. Unscrupulous racketeers began selling it. Dumps became dangerous places. Garbage collectors were assaulted. The less fortunate resorted to eating grass.... Then old people began vanishing without a trace. Mothers who had turned away momentarily were finding their baby carriages empty.¹³²

These “new” humans, powered by the “Ferrari engine” digestive tracts of their pig brethren, retain all the semblances of their “humanity” but gain the porcine drive for consumption. They cannot stop eating trash, they will eat grass, and more importantly than either of those transformations: they will eat each other. The government reacts quickly, killing many of the individuals who receive the surgery and placing the rest into internment camps. In these camps, there is no need to feed the inhabitants, because “first the detainees ate their clothes and went naked. Then the weaker men and women disappeared. Then the rest of the women. Then more of the men. Then we ate those we loved most.” Of all those who received the surgery, a single man was left, “an exceptional brute by the name of Jean Proti,” who survives for forty-one days “without a morsel of food except his own toes and ears.” Finally, “after 30 hours of incessant screaming, he died.”¹³³ If only Galen had been present to provide a lesson in vivisection...

The narrator of the story ends by claiming he “escaped.” What are we to make of this strange tale? Pigs do not consume each other under normal conditions — sometimes deceased corpses fall victim to consumption — so it would be incorrect to simply say the humans acquired porcine manners of consumption. At one level, Martel’s story plays on the deep concern that exists about the “confusion” of the “species barrier” that xenotransplantation might create: what if humans became *like* pigs? What if new organs in strange places made us less recognizable to ourselves? Yet Martel’s point is not simply one about the strangeness of combining pigs and humans together. The fundamental truth of the story is that shifts in human *consumption* have the dramatic power to transform the entire social life of the human species: in many ways, the gut

¹³¹ Ibid.

¹³² Ibid.

determines our ethical sensibilities. When the “xeno” — the truly “foreign,” the wholly other¹³⁴ — organ is transplanted into human bodies, it is not simply rejected: it takes over, rendering conventional notions of ethicality and morality void. Our representations of the world are destabilized and the world of commodities is thrown upside down: garbage becomes “a sought-after commodity” rather than a scourge, then old people “began vanishing without a trace,” until finally “we ate the children last.” The xenotransplantation effects an instability in the particular mode of world-formation that occurs due to consumption and absorption, that same manner of world-formation that has for centuries driven a relationship to pigs due to their becoming-pork, their edibility. And it would be wrong to underestimate the power of these consumptive shifts because, as Sloterdijk also argues, “The field of absorption-based truths is of fundamental significance for the construction of human reason because it is precisely there that the essential distinction between true and false comes into effect.”¹³⁵ After all, more than in even in the world-formation created by representation, “the false ultimately brings death; that which enables and extends life, on the other hand, can be considered the true.”¹³⁶

Yet if the inclusion of the pig organ into the human is the cause of this cannibalistic violence, surely Martel’s point is that the “human” way of eating produces a certain, valuable zero-level of ethical stability? The conclusion of the story contradicts this, as the one who “escaped” notes that “I still have a good appetite, but there is a moral rot in this country that even I can’t digest.”¹³⁷ This moral rot is left unexplained, unnamed, but the recipients of the transplant have all disappeared so it cannot reside there. Instead, “Everyone knew what happened, and how and where... But no one talks about it and no one is guilty.”¹³⁸ What is this taboo subject? The answer, I think, is articulated by Galen, of all people, in his text on the *Powers of Foods*: “The similarity between the flesh of man and pig in taste and smell has been observed when certain people have eaten unawares human meat instead of pork. Such incidents perpetrated by unscrupulous restaurateurs and other such people have been witnessed in the past.”¹³⁹ The xenotransplantation surgery forces a simple, brutal realization: that the consumption of pigs upon

¹³³ Ibid.

¹³⁴ Jacques Derrida, *The Gift of Death* (Chicago: University Of Chicago Press, 2007).

¹³⁵ Sloterdijk, 523-523.

¹³⁶ Ibid., 523.

¹³⁷ Martel, “Children.”

¹³⁸ Ibid.

which so much of Western society and knowledge was built relies on a carnivorous distinction that could, at any moment, have dissolved into cannibalism; that eating pigs was never so different from eating humans; and that cutting open pigs to learn about humans is not so different from cutting open humans to learn about pigs (the latter is, ironically, what happens in Martel's story). It is not that the humans of Martel's tale become like pigs: they treat each other as humans have always treated pigs. Wubs and biomedical pigs find a queer (a *swined*) revenge.

Could a vegetarian Galen be imagined and re-inserted back into history? Anatomical knowledge may have proceeded along the same lines. A vegetarian anatomy, a science with radically agnostic relationships to porcine tests, and a world without pig organ farms: are these even imaginable today? This paper cannot answer those questions. Instead, it has watched pigs float by humans in rivers of all kinds, into and outside of the "human body." It has tried, if not to save those floating pigs, at least to talk about them. To render them, momentarily, difficult to chew.

¹³⁹ Galen, *Powers of Foods: Book 3*, 155.

Notes

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