Consuming Bodies:

Ticks, Pigs, and Gothic Capitalism

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Abstract: A tick-borne illness is spreading throughout the eastern United States, causing victims to develop a spontaneous allergic reaction to eating red meat. This condition's etiology intersects with notable recent cases of porcine xenotransplantation: the insertion of organs from genetically altered pigs into human hosts. The same antagonist is present in these scenarios: the sugar alpha-gal, which naturally occurs in most mammals but not humans. This article draws from medical humanities scholarship, literature studies, and Bruno Latour's depiction of modernity as an engine that generates contradictory hybrids to locate cultural engagements with alpha-gal within a framework of Gothic capitalism. Market forces induce the bodies of pigs and humans to be cyclically conflated and differentiated to develop bespoke medical and edible products—both forms of sustenance—in response to a consumer logic that renders biological matter as a commodity. The overlapping biotechnical governance of food and medical systems thereby provides therapeutic and monetary benefits while being haunted by a historical lineage of dehumanization. Further studies that examine Gothic capitalism in similar products and practices can reveal how they respond to particular market-driven incentives and operate through rhetorical framing.

Keywords: alpha-gal syndrome, lab-grown meat, xenotransplantation, medical humanities, Bruno Latour, hybrids, zoonosis

Say howdy to *Amblyomma americanum*, commonly known as the lone star tick. If you are unfamiliar with this bloodsucker, you might brush up (pun intended), because it is a true American through and through, lingering low in backyard bushes amongst the fallen leaves, skulking through pine needles drifted against

retaining walls. Despite its folksy Texan handle, it is increasingly pervasive throughout the USA according to the Centers for Disease Control and Prevention (2011), having become endemic in the southeast and radiated outward as far as Maine and Nebraska. This matters because ticks have profligate mouths, and nothing good comes from a tick bite—at least not for the bitten; the tick absolutely loves it. Our two-stepping *Ixodidae* pardner siphons off nourishment, but we humans are left with a chance of tick-borne illness, which is a collection of afflictions as horrifyingly Gothic as any penny dreadful. Consider the literal situation: an unseen vampire extracts a blood meal and infects us with its invasive corruption. Fear of the unknown marks the tick bite, as Kate Maddalena (2021) writes in "Tick Problematic: Motherhood as a Posthuman Predicament," underscoring how humanity is entangled with nature not only in ways that invite tranquil fulfillment but also in those that imply "disease, medicalized pathology, and long, drawn-out worry" (para. 2). Maddalena points out that although medical science's analytical acuity has converted our bodies into informatics readily available through an emailed .pdf, tick bite exposure is fraught with superstition. Treatment is based not on the implacable authority of positive blood tests, which in these cases would be inherently inconclusive, but on signs and wonders, such as nebulous symptoms (the generic catch-all "flu-like") and the tell-tale erythema migrans bullseye rash that marks the damned. Tick illness is notorious for its ambiguity, because even when the acute condition resolves, sufferers can develop chronic post-treatment syndromes (CDC, 2022), invisible taints so amorphous and occult that medical science has been measured in even acknowledging or naming them. The victim becomes haunted: treated with skepticism and cursed with something that comes and goes while leaving shifting traces. And we must note that the tick only emerged as a problem when it became literally trans-sylvanian: it moved through the forest into our backyards, a consequence of habitat destruction, urban encroachment, and anthropogenic climate change. This is just as the problem with Count Dracula was not that he was a provincial folkloric specter feasting on Wallachian peasants; it was that he seeped into London on the fibers of empire's creeping global capitalism. Both suckers exact the bloody toll of Western colonial desires.

One of the lurking tick-borne conditions that has become recently salient is the acquired red meat allergy commonly called alpha-gal syndrome. Google Trends (2022) shows spikes in internet queries about the topic in the summers of 2014, 2017, 2018, 2019, and 2022, particularly in a band of states running through the

middle of the USA's eastern half. It has been addressed in bulletins by national and regional public health boards and covered in *Nature* (Nogrady, 2020), *The New York Times* (Albeck-Ripka, 2022), and *The Washington Post* (Ambrose, 2022), and it is a peculiar condition indeed. Occasionally after being bitten by a lone star tick, a person will spontaneously develop a persistent serious allergy triggered by eating red meat. The culprit is the aforementioned alpha-gal, which is not a third-rate Marvel character but instead a sugar found in most mammals although not humans. The allergy's etiology is not fully understood—according to Surendra Sharma and Shahid Karim's (2021) "Tick Saliva and the Alpha-Gal Syndrome: Finding a Needle in a Haystack," the promiscuous tick may acquire its taint from feeding on other animals—but it is believed that a bite can insinuate alpha-gal into a person's bloodstream, causing an immune response that precipitates an ongoing allergic sensitivity to red meat and related mammalian food products, such as dairy goods and gelatin. There is no particular treatment for the condition; as with most serious allergies, sufferers must be careful to avoid triggers or risk anaphylaxis.

But let us follow this discussion of a tick-borne meat allergy by turning to the news. A pair of stories that gained national attention addressed two separate but related cases of relatively successful xenotransplantation: organs swapped from animals into humans. A *New York Times* article (Rabin 2022b) captures one of the procedures in a Frankensteinian headline that could double as a schlock horror movie's tagline: "Kidneys from a Genetically Altered Pig Are Implanted in a Brain-Dead Patient." Jack-Yves Deschamps et al. (2005) point out in their "History of Xenotransplantation" that attempts to put animal tissue into and onto human bodies stretch back as far as the sixteenth century. Some parts have found a ready home in humans—heart valves, pancreas cells, skin—but major organ replacement has a poor history of recipient rejection. Our biological ties to other species are not close enough to soothe our immune response, so our bodies mark the borrowed viscera as an invader and attack. Nevertheless, this time the surgery worked as intended, providing promising early results for porcine xenotransplantation. The implanted pig kidneys started producing urine after about 23 minutes and continued to do so for three days, without showing signs of rejection (Rabin, 2022b, para. 5–6). Why did the swap work in this case? The answer is that medical science now has identified that a major barrier to xenotransplantation is—you guessed it—alpha-gal. It covers the surfaces of most mammalian cells and sends our immune systems into paroxysm. As

such, the genetically altered pig mentioned in the headline was modified to prevent it from producing alpha-gal, and accordingly, the human recipient did not show immediate signs of organ rejection.

The other, perhaps even more dramatic, story occurred around the same time and also hinged on a pig organ donor genetically engineered to eliminate alpha-gal. In this case, a 57-year-old man with serious coronary disease (but a very much living brain) received a xenotransplanted heart. Initial results were promising, and a few days after the operation, the recipient was sitting up in bed. According to the transplant surgeon, Dr. Bartley Griffith (as cited in Regalado, 2022) of the University of Maryland Medical Center, the borrowed heart was pumping fantastically and performing like a "rock star" (para. 3). Unfortunately, within about two months, the patient expired due to heart failure, but crucial here is that the subsequent postmortem analysis published by Griffith et al. (2022) in the *New England Journal of Medicine* showed no signs of organ rejection; however, screening did suggest that the heart may have been infected with porcine cytomegalovirus, a pathogen that infects pigs. It bears reiteration that this was not a zoonotic condition; the virus did not jump from the pig into the human host. Rather, although the full cause of death is unclear, it is possible that a man died because the hog's heart inside him got sick from a virus that only infects pigs.

Etched in the shared viscera of this man and this pig are what Bruno Latour (1993) identifies as modernity's paradoxical operations: creating hybrids of nature and culture and purifying existence into separate human and nonhuman "ontological zones" (p. 10). The second move "has made the first possible: the more we forbid ourselves to conceive of hybrids, the more possible their interbreeding becomes" (p. 12). The two come in tandem not *despite* being irreconcilable but *because* they are. Rabin's (2022a) article "In a First, Man Receives a Heart from a Genetically Altered Pig" in *The New York Times* notes that before the transplantation, six human genes were inserted into the donor pig's genome to make its organs more tolerable to the human immune system (para. 29). John Timmer (2022) reports in "Pig Heart Transplant Failure: Doctors Detail Everything That Went Wrong" that a postmortem examination found pig DNA and anti-pig-cell antibodies in the patient's bloodstream, evidence of a mingled body in conflict. The blending breeds separation, and the inclusion of animal parts opens the human body to truly foreign attack vectors from within and without.

Related research has continued apace. Similar genetically altered pig hearts were inserted into two brain-dead human patients in the summer of 2022. Nicole Wetsman (2022) notes in the technology website The Verge that the heart recipients were unable to be organ donors but were suitable candidates for whole-body donation (para. 3). This kind of blanket consent for novel research procedures to advance medical science binds human and animal bodies as commodified resources to be deeded, parceled, and exploited. Death also is becoming simply another meaty trait rather than a finality. David Andrijevic et al.'s (2022) piece in *Nature* "Cellular Recovery after Prolonged Warm Ischaemia of the Whole Body" details a process by which researchers restored pig organs' cellular functions one hour after death. It is a refinement of earlier experiments by Zvonimir Vrselja et al. (2019) that restored cellular functions to pig brains—although not conscious activity—four hours after death. The processes involve machine perfusion and chemical cocktails, tools largely in keeping with *Frankenstein*'s cultural heritage. This work was understandably somewhat sensationalized and its nuances blunted in articles such as Wired UK's "The Zombie Pig Brain Experiment Muddles our Definition of Death" (Jaekl, 2019). Swine here again serve as our ideal biological substitute, because the eventual goal of such experiments is to apply these protocols to human organs and preserve them for transplantation—a laudable endeavor, given the poor performance of the US transplant network revealed in a 2022 governmental review obtained by *The Washington Post* (Menn & Bernstein, 2022).

Maurice Merleau-Ponty's (1968) discussion of flesh in *The Visible and the Invisible* adds productive nuance to the Latourian hybridity present in the shared biology of people and pigs. *Flesh* is Merleau-Ponty's term for the material imbrication of objects and bodies, and it rhetorically asserts a common materiality, the "flesh of the visible," that is the shared sensible meat of what would be deemed the human and non-human spheres, or Latourian ontological zones (p. 136). Merleau-Ponty's levelling of flesh provides theoretical insight into the very tangible risks of interspecies biomedical applications. The commodification of flesh conjures a dark shadow of intimacy between creatures: it catalyzes pandemics. Public health consensus has coalesced around the zoonotic origins of Covid-19, due to public statements from the Centers for Disease Control and Prevention (2021), reportage from the Associated Press (Ungar, 2022), and academic research (Haider et al., 2020; Holmes, 2022; Pekar et al., 2022; Worobey et al., 2022). We might recall early folklore surrounding that global

pandemic's sinister origins centered around eating and so-called "wet markets"—we want to believe that the Gothic monstrosity of bat soup doomed us all (Miller, 2020), a gruesome icon that deftly links karmic penance for our insatiable human gluttony with chauvinistic disparagement of Asian foodways while adding a wan wink to *Dracula*.

We have only begun to grapple with what might happen pathologically if we institute large-scale replacement of human organs with animal ones. Helen Tiffin (2007) observes that despite the known risks of disease transfer from animals to people, "proponents of xenotransplantation assure us that careful monitoring will protect humans from such xenozoonoses" (p. 259). Accordingly, Dong Niu et al.'s (2017) article "Inactivation of Porcine Endogenous Retrovirus in Pigs Using CRISPR-Cas9" in *Science* documents a safeguard process that uses CRISPR, one of our latest presumed biotech saviors, to inactivate viral DNA in pigs' genomes. Nevertheless, seemingly even the most sanitary and stringent medical circumstances imaginable in 2021 could not preserve a human body from a pig pathogen; the outside is always also the inside. Antonio Regalado's (2022) article for *MIT Technology Review* notes that "transferring pig viruses to humans has been a worry," and he speculates that xenotransplantation could trigger a pandemic if a virus were to mutate inside a patient's body and then spread to others (para. 25). Those would seem to be grounded fears; before writing this article, I was quarantined in my home for two years because of a rampant zoonotic coronavirus.

Now we must pause and gather ourselves, because as we extrapolate toward alpha-gal's apotheosis, things become *actually strange*. Consider that we have a growing number of people who cannot eat red meat because a tick bite has made them allergic to alpha-gal, and we have the ability to engineer pigs for medical use that do not produce this sugar. It takes only a small imaginative leap to wonder if the former could eat the latter without triggering symptoms, and, poetically, the answer is a resounding yes. Sarah Zhang's (2022) article for *The Atlantic* titled "A Tick Bite Made Them Allergic to Meat" notes that Revivicor, the biotech company that engineered the pigs for organ transplant, has been quietly shipping refrigerated packages of alpha-gal-free bacon, ham, chops, and pork shoulder to people suffering from alpha-gal syndrome (para. 4). Zhang states that Revivicor provided the food without cost to explore the feasibility of an FDA-approved mail-order business, "And so a biomedical company has found itself an accidental purveyor of specialty pork products" (para. 4). We all should take comfort in the fact that the pigs raised for slaughter are

not the same ones used in xenotransplantation, because that requires additional genetic modifications to minimize rejection and make the organs an appropriate size (para. 13). Capitalist ethics are, as ever, principally driven by expense.

Of course, transplantation and consumption are not the only bodily overlaps with our animal cousins that are haunted by alpha-gal. Zhang (2022) points out that mammalian cells pervade medical products including replacement heart valves, vaccines, drug capsules, sutures, and monoclonal antibodies (para. 18). It is here that Revivicor's modified pigs may have a more mundane pathway into a broader marketplace of bodies. Zhang rightly notes that "they might not be as sci-fi as transplanting whole pig organs, but alpha-gal-free sutures and heart valves would matter to these patients" (para. 19). We can see Latour's (1993) contradictory drives in this circular consumption, as Zhang illustrates: "The genetically modified pigs that were created for xenotransplant research and then turned into niche pork products might become medical products again" (para. 19). Human and pig are hybridized through xenotransplantation, then purified to enable one to eat the other without untenable psychological trauma, then hybridized again through mundane medical practices that remove the thorn of allergic reaction from sutures, vaccines, and drug capsules. Flesh's vacillation between human and not-human serves market desires and is codified by institutional imprimatur such as FDA approval.

Although alpha-gal is a newly salient player, we have a rich lineage of biotechnical engagement with swine. David Biello (2006) points out in *Scientific American* that in 2004, researchers inserted a roundworm gene into pigs[1] to make them produce heart-healthy omega-3 fatty acids instead of their gauche omega-6 cousin. Although the goal was to study omega-3's role in heart disease, the culinary implications immediately became apparent. *The New York Times* breathlessly touted that "Cloning May Lead to Healthy Pork," pointing out that although omega-3 acids are readily available in many aquatic food sources, fish can contain high levels of mercury and be costly; additionally, "not everyone likes it" (Kolata, 2006, para. 8). Shellfish, a rich source of omega-3 acids, also can be a significant allergen, so once again the other white meat, properly modified, becomes a miracle allergy cure, a tamer of ticks and prawns.

Associations between humans and pigs are complex because physically and culturally they are our double. Textual connections

[1] Gross

to pigs have existed at least since Circe transformed Odysseus's crew into swine. Success with porcine kidney and heart xenotransplantation has led, as Max Kozlov (2022) writes in *Nature*, to a groundswell of physician support for clinical trials regulated by the FDA. This is because, as Magdalena Hryhorowicz et al. (2017) suggest in "Genetically Modified Pigs as Organ Donors for Xenotransplantation," the domestic pig is the "optimum donor" for xenotransplants (p. 435). Evidence for this abounds in the porcine tissue that has been successfully implanted into humans for decades. The pig's heart also has been used as a scaffold to grow a customized hybrid organ blended with human essence; CNN reports in Gothic language on Dr. Doris Taylor, who took a "ghost-like shell" of a pig's heart and "infused it with beating human stem cells" (*Can We Grow a Personalized Human Heart?*, 2022). This follows Jun Wu et al.'s (2017) study published in *Cell*, in which researchers injected human stem cells into pig embryos to create chimeras, developing a process that has the potential to grow transplantable human organs inside pig bodies.

For the purposes of this article, the fleshy link between humans and swine may be captured most potently in the phrase "long pig," which the *OED* states has been used in reference to cannibalism since mid-nineteenth-century travel accounts ("Long Pig," n.d.). We now find ourselves again reliving that era's Gothic revival, evidenced by media addressing literal cannibals, such as Netflix's true crime series about Jeffrey Dahmer (Franklin et al., 2022), as well as fictive ones in works including *Raw* (Ducournau, 2016), *Bones and All* (Guadagnino, 2022), *Fresh* (Cave, 2022), *The Terror* (Berger et al., 2018), *Yellowjackets* (Kusama et al., 2021), *Santa Clarita Diet* (Fleischer et al., 2017), and the multitude of texts in which cool cucumber Dr. Hannibal Lecter appears. Tiffin (2007) draws Merleau-Ponty's (1968) flesh into the specter of meat, underscoring that the matter of humans and animals is rhetorically rather than essentially separate. Terminology is what maintains divisions by classifying practices as common or taboo. This allows animals and humans to be rendered into the same base raw material, an undifferentiated resource suitable for exploitation and consumption. She asserts the anatomical and dietary similarities between humans and pigs, beginning her article with the scintillating statement that "[h]uman flesh tastes like pork" and pointing out that "its similarity in texture and taste to that of pork seems generally agreed upon" (p. 244). We become united within the alimentary canal, and "through the vehicle of 'meat,' the 'farm animal' literally disappears into the substance of the human; pig is incorporated as long pig" (pp. 251–252). Richard Routley (1982)

references long pig in his paper "In Defence of Cannibalism," asserting that cannibalism was globally widespread before being displaced by Western anthropocentrism born of Judeo-Christian tradition and the Enlightenment's elevation of the human, or in other words, "The common but mistaken assumption that there is something morally very special or distinctive about simply being a human, that Homo sapiens as a species deserves special treatment" (p. 1). J.H. Hutton (1943) similarly points to many examples of historical cannibalism, including in Europe and the Americas, in his Presidential Address before the Royal Anthropological Institute titled "The Cannibal Complex."[2] Others reject the existence of any sustained practice of cannibalism, perhaps most notably William Arens (1979) in his controversial but influential book *The Man-Eating Myth: Anthropology and Anthropophagy*. Arens finds little concrete evidence of cultural cannibalism globally but encounters copious narratives claiming that a degenerate other does it, concluding that "the significant question, then, is not why people eat human flesh, but why one group invariably assumes that others do" (p. 139). Tiffin (2007) clarifies that often the answer is racial chauvinism. Lines need to be drawn between the civilized and the savage so that the former's brutalization of the latter is ethically permissible. Tiffin holds that the cannibalistic horrors reported by European explorers and colonizers likely were due to misunderstanding, exaggeration, and prejudice, and presumed meals of human flesh "are now believed more often to have been pig rather than long pig" (p. 246). The Western eye needed to see cannibalism so that it might draw a bigoted line of differentiation to enable the "torture, killing and enslavement of these apparently 'savage' flesh eaters" (pp. 246–247).

Tiffin's (2007) address of the fluid terminological separation between humans and pigs reveals Latour's (1993) contradictory drive toward hybridity and purification, which is crucial because the distinctions—person versus animal, inedible versus edible, agent versus resource—are assiduously imposed precisely because the deep linkage can render us indistinguishable. The glib gendered statement that men are pigs has purchase because it is bound to our denigration of these animals as a loathed reflection of ourselves;

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[2] A contemporary summary of Hutton's address in *Nature* ("The Cannibal Complex," 1943) states that "One is told that 'long pig' makes good eating, but Prof. Hutton does not include this possible motive [for cannibalism]." It also concludes with the well-intentioned but nevertheless patronizing compliment: "Such an analysis of a 'savage' practice is very interesting and helps to show the ordinary Englishman how complex are the ideas of modern primitive peoples."

they are our imposed dark double—gluttonous, filthy, base, monstrous—all things that we have made them. Tiffin notes the "dreaded comparison" that we are all potentially food, pointedly referring to a 2002 criminal case in British Columbia in which a swine farmer was charged with sexually assaulting and murdering thirty-one women, then not only possibly feeding their remains to pigs but also processing some of their bodies into locally distributed meat (pp. 260–261). Carol Adams (1990) makes the gendered violence of such species leveling explicit in *The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory* by aligning farm animal mistreatment with assaults against women, asserting that in both cases the victims are reduced to a uniform commodified resource in a process of "objectification, fragmentation, and consumption" (p. 58). Louise Benson James (2017) explicitly attributes such sexualized anatomical reduction to the logic of Gothic capitalism in the special issue of *The Dark Arts Journal* devoted to the subject. Her article examines Marie Darrieussecq's French novel *Pig Tales: A Novel of Lust and Transformation*—in which a young woman within a patriarchal society sates capitalist desires through sex work while progressively shapeshifting into a venal, eroticized, cannibalistic pig—and identifies a commercial impetus behind the grotesque hybridized female and pig body that undergirds the "body politic" (p. 5).

The Gothic capitalism that James invokes is captured in Amy Bride's (2017) introduction to the same special issue, where she posits that the grotesque vernacular of genre fiction used to describe consumer-driven financial systems—corporate vampirism that bleeds workers dry, zombie institutions that must be propped up through human sacrifice, the death drive of markets—is central to destructive capitalist logics. In *Financial Gothic: Monsterized Capitalism in American Gothic Fiction*, Bride (2023) outlines how monstrosity provides particular insight into the operations of consumptive capital. Medical humanities scholarship has effectuated this connection by explicating multiple aspects of the Gothic capitalist link between organ transplantation and eating, this fleshly tie that binds. It is the focus of Sara Wasson's (2011) "'A Butcher's Shop where the Meat Still Moved': Gothic Doubles, Organ Harvesting and Human Cloning," in which she draws from the science fiction trope of producing clones to provide spare organs—citing works including Greg Egan's short story "The Extra," Michael Marshall Smith's *Spares*, and Kazuo Ishiguro's *Never Let Me Go*—to assert that global medical transplantation systems have become another form of predatory capitalist consumption linked to Gothic eating practices. Wasson holds that "the monstrous body glimpsed

through these texts is the body of the organ *recipient*, a body monstrous in its artificially enhanced ability to assimilate the tissue of others. In these texts, originals devour their doubles" (p. 73). She continues this depiction by asserting that the horror in these fictions derives from "the rapacious flesh of the recipient, engineered to devour" (p. 78), and that "the cannibal doubles are those who consume them, and those who bolster that practice by emptying the other's body of difference" (p. 81). A similar position is forwarded by Nancy Scheper-Hughes's (2001a) discussions in "Bodies for Sale" of organ harvesting as a form of late modern cannibalism (p. 1). She clarifies this depiction in another text by stating:

> [G]lobal capitalism and advanced biotechnology have inspired new medically-incited "tastes" (a New Age gourmet cannibalism, perhaps) for human bodies, living and dead, for the skin and bones, flesh and blood, tissue, marrow and genetic material of "the other." (Scheper-Hughes, 2001b, p. 54)

Scheper-Hughes (2001a) points out that the most common motivation provided by people (often in the developing world) who elect to sell a kidney is their desire to "feed the family" (p. 1). Donors' organs become food for their families through the proxy of capital, and the consumption cycle churns.

More fundamentally, these mingled medical and food science technologies reanimate questions about treating living body parts as property, palpable in, for example, the ethical discussions surrounding the HeLa cell line, as is addressed by texts including Rebecca Skloot's (2011) *The Immortal Life of Henrietta Lacks*. Here we overtly see parts of a Black body being institutionally appropriated as subservient objects, something to be mass-produced and exploited. And although the HeLa cell line has been an unquestioned boon for global medical research, the resultant benefits have been unequally distributed along lines of race, class, and nationality. Moreover, the line's development is thoroughly problematic and steeped in a cultural history of Black exploitation by the American medical institution. Theodora Danylevich (2016) ties this lineage specifically to consuming meat in "Beyond Thinking: Black Flesh as *Meat Patties* and *The End of Eating Everything*," which focuses on two texts: "Meat Patties," a brief video shot inside of an Alabama prison that features the dissection of an undercooked, decaying, processed meat slab given to prisoners as food, which is associated with the incarcerated bodies

of the Black inmates who are expected to consume it; and *The End of Eating Everything*, a gallery art film showing an animal/human hybrid "of black flesh visible in an animate body that is an enormous mass whose surface bears a dense layering of limbs, machine parts, erotic attributes, and disease spores" (para. 9). Danylevich registers the Gothic discomfort of these works' mingling of bodies and meat, noting: "Dehiscent black flesh communicates by the decentering of one's senses with the revulsion impulse such that one *feels* its horror—evoking a visceral reaction of disgust and refusal" (para. 5, emphasis in original). Robert G. W. Kirk (2018) in "The Experimental Animal" points out related themes in laboratory uses of animal bodies, connecting their status at a given moment to prevailing social attitudes toward class, race, and gender (p. 122). These issues simmer underneath cultured cells, and as Wasson (2011) states, the biotechnical benefits they offer inevitably inhabit a colonized binary, "flowing from East to West, from poor to wealthy, from female to male, from children to parents and from marginalized to powerful" (p. 76).

This unequal institutional linkage between organs and forms of consumption carries us toward our conclusion. At this point, it should come as no surprise to read a December 2020 press release from the FDA that touts: "FDA Approves First-of-its-Kind Intentional Genomic Alteration in Line of Domestic Pigs for Both Human Food, Potential Therapeutic Uses" (US Food & Drug Administration, 2020). This document indicates that the organization has for the first time approved a gene edit in animals intended for both medical uses and commercial food production. This is the now-sanctified fruit of Revivicor's tinkering with swine genetics to suppress alpha-gal, and it bears the whimsical trademark GalSafe pig. Within such a Gothic capitalist animal product, this Frankenstein's porker, we can trace the strange ramifications of contemporary biotechnology. Here in the codified textual adjudications of the FDA and US Patent and Trademark Office, in the mutant viscera of modified pigs and their medical and comestible applications, is precisely what Latour (1993) asserts when he states that nature and culture have never been severed, that the drive to purify is necessary to maintain modern existence while it inherently breeds hybrids that rebuke separation.

Writing in 2010, Susan McHugh adroitly predicted the FDA's endorsement of GalSafe pigs in "Real Artificial: Tissue-cultured Meat, Genetically Modified Farm Animals, and Fictions" by pointing to forms of lab-grown meat in Margaret Atwood's 2003 speculative fiction novel *Oryx and Crake* that enter human food chains as by-products of medical biotechnology rather than

planned outcomes of food science (p. 192). Anticipating Revivicor's status as a biomedical company and specialty pork provider, Atwood's (2003) book features genetically modified pigs called pigoons that were created with human genetic material—possibly including "human neocortex tissue"—to facilitate xenotransplantation but eventually found a place in the chow line (p. 235). As with GalSafe pigs, there is initially a rigid partition between organ donor and breakfast food, and "it was claimed that none of the defunct pigoons ended up as bacon and sausages" (p. 23). Nevertheless, it is popularly accepted that this has happened surreptitiously, which unsettles the novel's protagonist Jimmy because "he thought of the pigoons as creatures much like himself" leaving him "confused about who should be allowed to eat what" (p. 24). Like the GalSafe pigs, pigoons become part of human flesh directly through surgery and indirectly through meals, a fusion that "shows the potential for what can happen when scientists and regulatory officials alike approach meat animals and the humans who keep them together, as significant economic and social players who share fragile environments" (McHugh, 2010, p. 195). The FDA nods approvingly.

Stephanie Lance's (2020) "The Cost of Production: Animal Welfare and the Post-Industrial Slaughterhouse in Margaret Atwood's *Oryx and Crake*" focuses particularly on the Gothic capitalist structures at play in Atwood's novel, identifying how meat's move from the slaughterhouse to the science lab enables multiple forms of predatory consumption that generate profit by extending human life. Recalling the ethical concerns surrounding the HeLa cell line, Lance asserts that this capitalist blurring between animal and human at the boundaries of life subjugates both. The human DNA that is stitched into pigoons and the marginalized people on civilization's periphery exist only as resources to exploit or mass markets to sate. Here biology becomes a commodity. The "animal-like bodies" created "via advanced genetic engineering and cell manipulation conducted within science labs" bend to elitist desires (p. 64). Fiction and fact are becoming blended under the watchful eye of US regulatory agencies. In Atwood's novel, the pigoons become de facto long pigs, gene-edited semi-human smorgasbords of implantable organs and comestible meat, while the bureaucratic murmur of an institutional press release moves us a quiet step further into an already-present future.

Palpable in our complex cultural interactions with the specter of alpha-gal is the revivified invisible hand of Gothic capitalism. When we pluck at the embedded lone star tick—this pestilent, Lilliputian vampire—we expose an imbricated system of hybrid flesh, the

mingled blood, bodies, and organs of pigs and persons. Their market-driven biomedical leveling is impelled by desire, enabled by gene editing, and leveraged through eating and surgery, and it shows the tepid horror of biology rendered as raw material exploited by rhetorical-technological control. Meat is terminologically made human and not-human in a recursive cycle as needs dictate and then accordingly decomposed, combined, parceled, and distributed as life-extending therapies and bespoke commercial commodities. And of course, this process spirals beyond the implications of tick-borne illness, emerging in discourse around, for example, plant-based meat substitutes, cultured animal cells, 3D-printed organs, and gene therapies. Further studies that trace the thread of Gothic capitalism in such biotechnological and biomedical developments may productively identify their consumerist incentives and rhetorical mechanisms as they remind us that while we rightly relish the fruits of research science so too are we haunted by its mundane monstrosities.

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