

**A GRAMMAR OF ANIMALS: DRAMATISM, ANIMAL EXPERIMENTATION, AND
THE NARRATIVE OF BIOMEDICAL PROGRESS**

by

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Abstract

Using Kenneth Burke's dramaturgical understanding of language as action, and drawing from literature in rhetoric of science and medicine, this thesis argues that the rhetoric of biomedical researchers, advocates, and popularizers perpetuates a progress narrative when using and advocating for the use of experimental animals that disregards animal interests and ethics. First, this thesis examines how transgenic experimental animals are rhetorically constructed as the place, and researchers as the means, of biomedical data, which provides discursive distance from the acts of experimentation. Likewise, the terms affixed to research animals, such as “Oncomouse,” “model,” and even “rodent” function to reflect realities of these research animals that creates discursive distance as they are used to produce knowledge. Second, this thesis examines how biomedical researchers and advocates who disagree about the efficacy of the animal model are united in their rejection of serious animal ethics in biomedical research. Critics of animal experimentation are made into monsters, while serious animal ethics itself is considered either monstrous or irrelevant to biomedical inquiry by groups of researchers who otherwise disagree about animal experimentation's usefulness in biomedical research. Third, it examines how the genre of popular biomedical entertainment seeks to persuade non-expert audiences to be entertained by biomedical research using animals. In addition, biomedical research and animal entertainment industries such as zoos and pet production have a complex, mutually beneficial relationship that makes use of animals to produce knowledge and entertainment at the expense of animal interests. This thesis concludes that the narrative of biomedical progress is underpinned by powerful rhetorical forces applied to animals that reject the serious consideration of their interests that could otherwise complicate such a narrative. A

suggested way forward could be a more complex biomedical narrative that includes serious animal ethics as part of biomedicine's "moral progress".

Preface

This thesis is the original, unpublished, independent work of the author, Warren Bowen.

This thesis involves no research on human or nonhuman animals. Ethics approval was neither required nor obtained.

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*For those who think
and feel
animals deserve better from us.*

Introduction

This thesis is a rhetorical analysis of how biomedical researchers, advocates, and popularizers of biomedical research write about experiments with animals, and how this writing perpetuates the narrative of biomedical progress. By “narrative of biomedicine progress” I mean a collective discourse that seeks to persuade audiences of biomedicine's normative advancement, expansion, and increasing production of medical knowledge. Rhetorician of medicine Judy Segal explains, “[t]he most salient narrative of medical history is the narrative of progress, the narrative that says, ‘We used to have things wrong, and now we have them right, or are on the road to having them right’” (21). This narrative offers “[f]rom-ignorance-to-knowledge accounts” of biomedical progress that treats knowledge in a forward trajectory (163). An integral component to this progress narrative is animal experimentation described as a method by which gaps in biomedical knowledge are filled. In this thesis, I argue that the rhetoric of biomedical reports, of research advocacy and criticism, and of popular biomedical entertainment functions to perpetuate the progress narrative in three main ways by: 1) constructing discursive distance between researcher, audience, and animal; 2) rejecting serious animal ethics as monstrous or irrelevant; and 3) seeking to persuade non-expert audiences to consider biomedical animal experimentation as entertainment.

I analyze animal experimentation in the context of this narrative using rhetorical interpretation and criticism. “Rhetorical criticism,” writes Segal, “identifies the persuasive element in the discourse of health and medicine and asks, ‘Who is persuading whom of what?’ and ‘What are the means of persuasion?’” (2). In order to answer these questions, I turn to the dramatistic methods of rhetorician and literary theorist Kenneth Burke. I choose Burke because

he offers the means to consider language as action—action motivated to persuade. By making use of his interpretive device, the pentad, and his understandings of terministic screens, occupational psychosis and trained incapacities, my aim is to answer questions of the content of persuasion by biomedical researchers, advocates, and popularizers, and the methods by which this persuasion is attempted. My topic of research and the methods I use are situated in rhetoric of science and medicine as part of the broader field of science and technology studies, which I rely on for methods of analysis of the language, motives, and purposes of biomedicine and progress.

In chapter one, “Terminal Distance,” I analyze a biomedical report, “Spontaneous Mammary Adenocarcinomas in Transgenic Mice That Carry and Express MTV/myc Fusion Genes” by Stewart, Leder, and Pattengale, which is the first report that demonstrates the possibility of creating transgenic mice. I argue that the way this article rhetorically constructs scientists and mice enables a distance necessary for such experimentation to seem ethically appropriate for the narration of biomedical progress. I begin this chapter with an explication of my methods and how I will apply them. Using Burke's pentad, I argue that mice are rhetorically constructed as the passive site of biomedically active data, while at the same time researchers are constructed as the passive means required for this data to act. As mere places, the interests of mice in health, freedom from suffering, and in living cannot be considered in any meaningful way, and as mere means, researchers and their actions are drained of responsibility. Both mice and researchers become “inanimated”. I develop this argument further by arguing that the terms, the “terministic screens” (Burke, *Language as Symbolic Action*), affixed to research animals—and even the term “rodent” itself—reflect feared and loathsome realities about these animals that persuade audiences of the appropriateness of the use of such animals as experimental objects in

the progress narrative while serving also to deflect realities about rodents that could prompt the serious consideration of their interests.

In chapter two, “Monstrosities and Incapacities,” I argue that serious animal ethics is rejected in biomedical research by two groups of otherwise opposed biomedical researchers and advocates who disagree about the methodological usefulness of animal experimentation. This similarly motivated rejection of serious animal ethics by opposed biomedical researchers and advocates serves to perpetuate the progress narrative. Advocates of animal experimentation Ellen Paul and Jeffery Paul, Charles Nicoll and Sharon Russell, and Adrian R. Morrison, share an identifiable “occupational psychosis” (Burke, *Permanence and Change*), which explains why they advocate for the use of nonhumans in biomedical research and reject serious animal ethics in their field. They do so by rhetorically constructing critics of animal experimentation as monstrous. Ray Greek and Jean Greek, Hugh LaFollette and Niall Shanks, and Pandora Pound et al., who criticize animal experimentation in biomedical research on grounds of inefficacy, reject serious animal ethics in their field as well, but in their case they suggest it is irrelevant to scientific “fact-making”. They do so because of what Burke would describe as an identifiable “trained incapacity” (*Permanence and Change*).

In chapter three, “Experimental Entertainment,” I argue that Emily Anthes, Greg Gage, and Laurel Braitman, writing and performing in an identifiable genre of “popular biomedical entertainment,” seek to persuade non-expert audiences of the value of animal experimentation and animal entertainment industries such as zoos, aquaria, and pet production for biomedical progress. This chapter explores the mutually beneficial relationship between biomedical research and animal entertainment industries: biomedical research finds lucrative markets and public displays of drug efficacy in animals via animal entertainment industries. These industries find

new ways to genetically and technologically alter marketable animals, and the means to medicalize and control problematic captive entertainment animals using psychopharmaceuticals. As in chapter two, these authors again seek to persuade audiences to consider animal ethics as a needless impediment to biomedical-animal-entertainment progress as part of an occupational morality. I conclude by introducing a term, the “technocircus/medizoo,” to name a site of occupational psychosis where biomedicine and animal entertainment interact to each other's benefit, and at the expense of a serious consideration of animal ethics.

Ultimately I demonstrate that biomedical researchers, advocates, and popularizers who write and speak about experimental animals perpetuate the narrative of biomedical progress in three ways. First, their use of rhetorical distance enables empathetic distance necessary for experimentation in the first place; second, they create monsters out of biomedical critics and suggest serious animal ethics are irrelevant to biomedical research; and third, and they seek to persuade non-expert audiences to be entertained by biomedical animal experimentation as part of desirable progress.

Chapter 1: Terminal Distance

In this chapter my goal is to demonstrate how the rhetoric of biomedical discourse in the context of experimental¹ nonhuman animals functions to distance researchers from these beings in the pursuit of biomedical progress. The rhetorical analysis I employ is Kenneth Burke's dramatism, and I begin this chapter by explicating my understanding of Burke's dramaturgic methods followed by a brief overview of how these methods have been used in another piece of relevant research. With these two outlines, I then investigate my primary artifact: the first transgenic mouse study, published in 1984, that led to the development of the Oncomouse. From this dramaturgic method, I move to examine the various reflected and deflected meanings of the terms used in this biomedical discourse using Burke's understanding of terministic screens. I conclude by suggesting that the rhetoric of biomedical nonhuman animal experimentation nurtures a distance and desensitization towards scientists' sentient research objects that permits such experimentation in the first place.

1.1 When People Are Places: Dramatism and the Pentad

As a method of rhetorical analysis, dramatism, Burke says, is “a technique of analysis of language and thought as basically modes of action rather than conveying information” (*Language as Symbolic Action* 54). Dramatism frames language in terms of a drama: a rhetorical scene where language is necessarily suasive. Seen this way, rhetoric “is rooted in an essential function of language itself, a function that is wholly realistic, and is continuously born anew; the use of language as a symbolic means of inducing cooperation in beings that by nature respond to

¹ Here experimental means both experimented upon and themselves experiments.

symbols” (*Rhetoric of Motives* 43). Dramatism is a methodology for interpreting not the information conveyed in a given discourse, but the motives of the suasive actions of a given discourse. It offers a means to treat a given discourse as a set of symbolic actions, rather than evaluating the truth-value of information supposedly conveyed by that discourse. In understanding language this way, one is better positioned to interpret otherwise opaque motives behind what is communicated. Motives interpreted in such a manner can illuminate the purpose and function of symbolic actions, and this contextualizes discourse within wider motivating forces that encourage people to act with language in the way they do. It is a method to understand why someone does what is done when understanding language as *doing*, as *acting* to persuade.

Dramatism's method for interpreting these motives is the pentad. The pentad seeks to account for the scene, act, agent, agency, and purpose in a given discourse. As Burke explains, “any complete statement about motives will offer some kind of answers to these five questions: what was done (act), when or where it was done (scene), who did it (agent), how he did it (agency), and why (purpose)” (*Grammar of Motives* xv). Put another way, scene is the location where the agent acts. Agency is the means by which the agent acts, the instrument through which the act is done. Purpose explains the reason for the agent having acted in the scene with their agency. It is important to understand that the application of these terms in a given discourse is subject to the guiding purpose or ideology of the one doing the analysis. While my analysis might interpret a given object as agency, another might interpret that same thing as act or scene, and these choices will often reflect what is possible within a given ontological framework. My own bias will be implied in the kind of dramatisitic analysis I offer as I demonstrate discursive distancing between researcher and subject.

The interpretive fruits of the pentad are greatest when one considers what Burke calls a ratio of terms. A ratio is a relationship between two of the five dramatic terms that contributes to a rhetorical understanding of motivation otherwise indiscernible: one may look to the scene-agent ratio, for instance, to better interpret how the place shapes the person or how the person shapes the place. “That is,” Burke explains, “the scene-act ratio either calls for acts in keeping with scenes or scenes in keeping with acts—and similarly with the scene-agent ratio” (*Grammar of Motives* 9). So there is a consistency of motive when one looks to a ratio of terms. And there is circularity, too: “[i]f an agent acts in keeping with his nature as an agent (act-agent ratio), he may change the nature of the scene accordingly (scene-act ratio), and thereby establish a state of unity between himself and his world (scene-agent ratio)” (19). The ratios are “principles of determination” that serve to explicate a more detailed interpretation of the motives in a given discourse (15). Twenty ratios, then, are available for pentadic use: each pairing can be reversed to order them from potential to actual; for example, the agency-scene and the scene-agency are different insofar as the former conveys potentialities in the scene that are actualized in the agency, while the latter conveys potentialities in the agency that are actualized in the scene (262). I use the ratio of agency-scene to understand how the rhetorical inanimation of transgenic mice as scene is determined by how researchers rhetorically inanimate themselves as agency of biomedical data. I turn now to an example of this method in a human biomedical context.

In “The Rhetoric of Dehumanization” Martha Solomon conducts a dramatic analysis on the scientific reports of what is widely known as the Tuskegee Syphilis Project. This longitudinal study conducted in Alabama from 1932 to 1972 in order to trace the “‘natural history’ of the adult male Negro” with untreated syphilis has since been publicly lambasted for failing to treat subjects suffering from syphilis in order to generate biomedical data (233).

Solomon uses Burke's pentad to demonstrate how the rhetoric and genre of science writing contributed to the dehumanization of those research subjects involved in the Tuskegee studies. Solomon describes how the “agent is syphilis, whose effect is ‘the production of morbid processes involving the various systems of the body’ and ‘disability in the early years of adult life’” (237). The black patients, then, are the scene of disease, a disease whose actions are those under the scrutiny of the scientists; the disease acts *in* the patients—patients who are passive recipients of syphilitic morbidity. She interprets how the same patients are also, at other points, the agency by which the scientists’ purpose of advancing medical knowledge is achieved (240). Writing that the “convention of detachment and scientific discrimination accentuated the polarization of between subjects and investigators,” Solomon concludes, “the fact that scientific rhetoric makes no distinction in its approach among inanimate objects, animals, and human beings is noteworthy” (244). This rhetoric of black subjects dehumanizes them, and this functioned to obscure the moral issues involved in such a study. Burke would describe such distancing as an instance of the principle of discontinuity: terms that take things apart, disassociating one from another (*Language as Symbolic Action* 49).

While Solomon's goal was to demonstrate how the genre and rhetoric of biomedical research on humans in the Tuskegee Syphilis Project dehumanized experimental humans, I am concerned with a similar yet distinct task. My goal is to demonstrate how the genre and rhetoric of biomedical research on nonhumans in a transgenic mouse study *inanimates*. I choose “inanimate” with care: animate and animal are etymologically derived from that which is instilled with life, that which breathes, and that which is living, and has “soul” in a way that speaks, I take it, to agency, action, psychic experience, and spontaneity. These biomedical studies undo this animation, this animality, in ways both literal, by killing, and metaphorically,

through rhetoric. They “de-animalize” in their rhetorical constructions of experimental nonhumans in way reminiscent of the dehumanization of black test subjects in the Tuskegee studies. And, further, the agency-scene ratio reveals that this motive to inanimate applies also to the human researchers who conduct this research.

The scientific medical study I analyze is the first paper published on the creation of what is now known as the Oncomouse. The Oncomouse is a transgenic mouse genetically modified to express cancer and pass this likelihood to offspring, and the first animal to be patented (Robins). In the October 1984 volume of *Cell*, published one year before Solomon's rhetorical work, Timothy A Stewart, Paul K Pattengale, and Philip Leder, published their work with transgenic mice who would become known as Oncomice under the title, “Spontaneous Mammary Adenocarcinomas in Transgenic Mice That Carry and Express MTV/myc Fusion Genes”. Technically listed as an advertisement (636), the article is the original research conducted to produce thirteen strains of transgenic mice in which part of a regulator gene (one responsible for how other genes express) is modified to house a “mouse mammary tumor virus promoter” (627). The article establishes the possibility of modifying the genes of mice in order to increase the likelihood of developing malignant tumors later in life, and, crucially, that this likelihood is inherited.

Transgenic mice in general and the Oncomouse in particular have been influential in both biomedicine and the legal system. It split the Supreme Courts by 5-4 in the US in favour of and 4-5 in Canada against permitting an animal to be so inanimated as to be patented, a mere proprietary instrument (Robins). The Oncomouse has helped differentiate a legal-market approach to a particular branch of proprietary animal modification between two ideologically aligned countries (Robins). As Donna Haraway consistently highlights, the name is actually

“Oncomouse™”: it is a proprietary brand owned by DuPont (*Modest_Witness*). In biomedicine, transgenic animals modeled after the research of Stewart, Pattengale, and Leder, have taken hold of significant areas of medical research: from the early 1990s to early 2000s, transgenic animal research leaped from less than a percent of global research animals to twenty percent. By 2005, transgenic animals featured in almost one million regulated procedures, accounting for more than a third of all scientific procedures using animals, according to UK Home Office reports (Monamy 60). Reported transgenic animal use has more than doubled since 1997, and mice remain the most frequently modified animal (Ormandy, Schuppli, and Weary), estimated at 98% of all transgenic research projects (Monamy 61). The Oncomouse™, and transgenic animals in general, are an important moment for both biomedical research and the interface between animals and proprietary law.

Importantly, transgenic mice are an apex of nonhuman animal experimentation², a kind of Burkean *entelechy*, which, Ian Hill explains, is the propensity to seek symbolic perfection by being goaded by the “spirit of hierarchy” to achieve the ultimate end of a technological aim (6). “The implications of entelechy,” Hill writes, “for Burke’s philosophy of technology mean that humanity faces a constant drive to follow its projects through to their completion, regardless of the probable negative ramifications” (8). Part of being goaded to pursue a mouse as a piece of transgenic technology is for biomedical knowledge production to progress toward an *entelechial* perfection of scientific truth in animal modeling. In the next section, I use the pentad to explore the rhetorical constructions that, as a narrative trope in the biomedical genre, enable this knowledge production.

² And an important example of Burke’s understanding of occupational psychosis, a concept I will explain and make use of in chapter two.

1.2 Transgenic Mice and the Pentad

In this section I apply a dramatic interpretation to the transgenic mouse study by Stewart, Pattengale, and Leder in order to demonstrate the rhetorical motives latent in such biomedical discourse. I begin by interpreting the purpose, followed by the scene and act, and lastly the agent and agency. After interpreting the five pentadic elements, focusing on the ratio of agency-scene will provide an interpretation of motive that sheds light on how the genre of biomedical writing and reporting functions to distance researchers from their experimental animals for the sake of progressing knowledge.

The purpose of this biomedical research study is the production of missing biomedical knowledge. Stewart, Pattengale, and Leder write that “[d]espite the importance of these genes, knowledge concerning their action in a living organism is, at best, incomplete,” and that, “the notions [of *myc* gene deregulation and collaboration] have not been tested in the context of a living organism,” (627). Transgenic mice must be engineered in order to attend to perceived gaps in biomedical knowledge. Without attendance to such knowledge gaps, a narrative of biomedical progress would falter; the *entelechi*al creation of ancestrally malignant mice maintains the progress narrative by supplying the necessary data for relevant knowledge production. Doing so, however, requires the distancing of researcher and subject and the production of inherently defective mice.

One of the most effective and obvious distancing strategies employed by Stewart, Pattengale, and Leder in their study is the rhetorical construction of their sentient research subjects as the place in which the biomedical action happens. The mice in their research become the site where agents act: the murine scene. Constructing mice as scene inanimates them; their animality is replaced by locus as they become the mapped terrain of disease and biomedical

research, not unlike how, according to Foucault, the medical gaze serves to dehumanize human patients by viewing them as the site of disease, interesting only for their expression of medically objectified illness (*Birth of the Clinic*).

Almost immediately the audience is urged to perceive the mice as living organisms *in which* action of biomedical interest happens. Early in their paper, Stewart, Pattengale, and Leder inform the reader “that knowledge concerning [the genes'] action *in a living organism* is, at best, incomplete” (emphasis added) (627). Embryonic mice serve as “mouse libraries” (629), buildings that literally contain sought-after genetic text, a metaphor consistent with genetic “codes” and nucleotide “letters”. Using such libraries, the researchers “have created 13 transgenic strains *in which the fusion gene is expressed in a variety of tissues*” (emphasis added) and that “it was important to determine the extent of expression of the fusion gene *in various organs*” (emphasis added) (628). “141-3, a 206-day-old female,” detail the researchers, “carrying an MTV/*myc* fusion gene from which the normal *myc* promoters had been deleted (MTV-H3 *myc*, Figure 1), developed a subcutaneous mass *in the right neck region* [and] another founder, 164-4, a 228-day-old female...also developed a subcutaneous mass, *in the left groin area*” (emphases added) (630). Being scene, the mice are valuable only in their ability to track records of acts in terms of locus and time. Burke says of timekeeping that it is a “‘scenic’ statement” (*Grammar of Motives* 12). Transgenic mice in the murine scene are keepers of place and time, of where and when; their tissues, organs, and bodies and parts are the scene, and they record when, to the day, the agent acts within them. Their naming, then, demands specificity for the task: the mice are numbered units, and their passing days are meticulously tracked in order to correlate acts of biomedical interest that can contribute to a progressing knowledge base.

These mice, as scene, facilitate the malignant masses. They “were found to have *retained the injected sequences*,” (emphasis added) and while they did not mate, they “*were mated to uninjected control animals to determine whether the injected genes would be transmitted through the germ line to viable offspring*” (emphasis added) (628). They “carry” given gene constructions (629). Like holding tanks and pipelines, mice channel the acts of scientific interest. They are the terrain through which things move. Stewart, Pattengale, and Leder inform us that, after such transmission, “a double insertion had occurred whereby the injected sequences integrated into two independently segregating *loci in each animal*. In another case, 165-1, there appeared to be a polymorphism *at a single locus*” (emphases added) (628). Upon transmission, the progeny of the pipeline mice are reproduced as scenes of engagement and parts of their bodies, too, become the place where heritable, malignant genetic activity expresses.

Cancer is the act that happens *in* the murine scene. In these body parts, Stewart, Pattengale, and Leder explain that the “tumor *in* mouse 141-3 recurred approximately 2 weeks later (again during the later stages of pregnancy)” (emphasis added) and that another tumor “has been successfully established *in* nu/nu mice,” (emphasis added) (630). Imaging of founder mouse DNA is titled, “the Tumor That Arose In Mouse 164-4,” (634 Fig. 7). Here, these tumors do not even belong to the mice who have them—the possessive is not used, though it could be (mouse 141-3’s tumor)—but, rather, the tumor resides or arises *in* her, as though she were a cup. The *tumor* successfully establishes in mouse 141-3-38, while she is the inanimate locus of establishment. Just as the genes of her offspring will come to be owned by Du Pont in the US, so, too, does her tumor not belong to her, and nor do her own body parts: we do not read of *her*, or even *its*, neck or groin region, but of *the* neck and groin region. With their numerical identities, it is as if the mice were GSP coordinates. Indeed, mapping is too familiar a metaphor for research

animals who have their genome sequenced, and their bodies divvied up along the proprietary borders of grammar and the law. Genetic cartography, like its terrestrial counterpart, turns out to be just as penetrative: both forms enable the progress of invasive enterprises—biomedicine, colonialism—by charting sites of information necessary in forward movement in hitherto uncharted territory.

Stewart, Pattengale, and Leder rhetorically construct the MTV/*myc* fusion gene as the agent, which is hypothesized, after modification, to cause adenocarcinoma in the murine scene. “[A]n oncogene product *that acts at the cell surface* might influence the activity of... proto-oncogene products *whose actions impinge upon* nuclear reactions related to cell growth and division,” (emphasis added) and that, “in the case of the *myc* gene, two major notions regarding *its action* have emerged” (emphasis added) (627) constructs the modified *myc* gene as that which *acts* and which *has action* as agent³. A diverse ensemble of verbs compose this modified gene as an agent who acts in ways of biomedical interest necessary to progress knowledge. The modified mouse *myc* gene “appears to act as a heritable, predisposing factor favoring the accelerated development of a tissue-specific adenocarcinoma” (627); “collaborates with other oncogenes” (627); “is sufficient to cause the malignant transformation of these cell” (628); “participates in the transformation of a wide variety of cell types” (628); “can contribute to the immortalization of cells” (628); “provided the *myc* regions” (628); “eliminates the normal *myc* promoters” (628); “will produce RNA that will protect fragments of the probe 520 and 353 bases long” (631). These complex actions—*acting, favoring, collaborating, causing, participating, contributing, providing, eliminating, producing, protecting*—initiated by the agent, give rise to the dramatic

³ Not unlike Richard Dawkins's interpretation of genetic agency in *The Selfish Gene*.

act of malignancy generation. The MTV/*myc* fusion gene is the agent in this biomedical drama, and it wields Stewart, Pattengale, and Leder as means to malignancy.

Pronouns in the article also function to construct the mice as scene and the *myc* gene as agent. The pronoun, *it*, is too vague for the specificity of their task as scene; each mouse/site must be differently numbered in order to track the acts of the agent. *The mouse* is not agent in this discourse—rather, *individual mice* are scene. *It* is reserved only for the agent of this biomedical discourse. As explained above, the mouse rhetorically fails to possess her own tumor and body parts. Since use of *it* for animals rather than *he* or *she* is often used as a grammatical means of excluding nonhumans from considerations of personal relations in the human sphere (Adams 54), the denial even of the impersonal pronoun *it* seems to suggest an even deeper level of inanimation than normal in biomedical discourse. Only in one revealing instance is this convention broken. The authors write, “[p]edigree analysis of restriction fragment patterns of the 164-4 founder animal, *its offspring*, and the mammary adenocarcinoma are more complex” (emphasis added) (632). This sentence is in a paragraph that is separated by a malignancy pedigree tree. The caption of reads, “[I]tters 1 and 2 of the founder animal did not survive the initial postpartum period because of maternal neglect” (633). Stewart, Pattengale, and Leder prime their audience for this single awkward shift of a mouse from scene to agent in order, I believe, to shift the responsibility for a dead litter away from them, the scientists charged with the well-being of the research animals in their lab, to the mouse herself, who is suddenly the agent who failed to mother *its* offspring (not “the” offspring). In doing so, they manage to shroud androcentric maternal normativity in the ostensibly innocuous rhetoric of science writing. What is expected of a female mouse mother in conditions of biomedical experimentation? The motive

is to have the audience see the mouse, for the first and only time, as a being in possession of her offspring that die of neglect so that questions of *whose neglect* are neglected.

The actions of the researchers are inanimated by a ubiquitous grammatical passivity consistent with the genre of biomedical and scientific reporting that works by contrast to highlight the animate, malignant acts of that which is of biomedical interest (on the use of passive voice in science writing, see also Bazerman 169; Campbell 74; Gusfield 20; and Segal 72, 119). Stewart, Pattengale, and Leder are the means through which the agent is able to achieve its acts. They write that mice “*were mated* to uninjected control animals to determine whether the injected genes *would be transmitted* through the germ line to viable offspring” (emphases added) (628). Such invasive, purposeful actions as mating and injecting are constructed as background means to enable the biomedically interesting action of the genes in transmitting themselves across the terrain of the scene that contributes to knowledge production. Detailing the process of modifying the *myc* gene, the researchers explain, in markedly passive language, that, “[t]he MTV-Stu *myc* and the MTV-Sma *myc* constructions *were formed by* digesting pA9 with Sma I and Eco RI,” (emphasis added) that “a partial Sma I digestion *was used to* generate a number of MTV-Sma *myc* plasmids” (emphasis added) and furthermore, that, “[t]he MTV-Xba *myc* construction *was produced by* digesting the MTV-Sma *myc* plasmid with Sma I and Xba I, the Xba I end *was made blunt with* Klenow ploymerase” (emphasis added) (629). In keeping with the genre conventions of biomedical research reporting, Stewart, Pattengale, and Leder rhetorically construct themselves as a passive force in the process of the creation, development, and reproduction of the modified *myc* gene, becoming the agency to the modified *myc* gene: they discursively enable it to act by ensuring their own actions of modification creation are passive,

almost indiscernible—they are made inanimate. Their actions are not those of biomedical interest, and knowledge progresses by understanding that which is.

Modified *myc* genes in the scene of the mouse body begin to act upon it creatively. So creative is this process, so active, that the credit for transgenic mouse creation seems at odds with conventional, anthropocentric understandings of who an agent can be (Latour, *Pandora's Hope*). Early in their paper, Stewart, Pattengale, and Leder express a conventional understanding of themselves as agent when they admit that, “we created 13 lines of transgenic mice” (628). However, this convention is not long-lasting as it does not align with constructions of active biomedical data that acts as an agent: “[t]he two cases of double insertion and one case of polymorphism in the ten original founder animals *have given rise to* 13 distinct lines of MTV/*myc* transgenic mice” (emphasis added) (628). It is the injected modified *myc* gene that, after integrating with the mice's genes, creates the 13 lines of transgenic beings. Elsewhere, they expound a conventional grammar of the human agent, “we developed several constructions of the mouse *myc* gene” (627). The constraints of a genre that demands a rhetorical reconstruction of a nonhuman agent from a typically human one can account for these contradicting grammars of active and passive, active grammars perhaps necessary for a group of researchers who must demonstrate novel development in order to secure a patent.

It is not a straightforward task to author oneself as an instrument, but the genre of science writing enables and demands such rhetorical construction. As Solomon concludes in her rhetorical work on the Tuskegee syphilis project, the genre of scientific report writing “makes no distinction in its approach among inanimate objects, animals, and human beings” (244), and, for my purposes, among researchers as well. The genre of science writing is structured so as to permit the dissolution of the human agent in favor of a grammar that highlights the action of that

which is of interest (Gross; Bazerman). Consistent faithfulness to this style can be challenging; nevertheless, it is clear that the acts of the modified *myc* gene are those whose observation is most intended, and constructing the gene as agent focuses attention to this end. I do not deny that these scientists are agents in a more metaphysical sense and accountable for their actions (Campbell 399); dramatically, however, that is not how the rhetoric of this article functions. Ultimately, these men are the agency of an agent that is not human—the modified *myc* gene—and the pentadic ratio of agency-scene helps to understand the implications of such a rhetorical construction⁴.

The ratio of agency-scene informs us that the potential for researchers to be inanimated determines the realized inanimation of mice. As agency, Stewart, Pattengale, and Leder are instrumentalized, turned into tools for the object of biomedical interest. The potential of biomedical and scientific genres that demand a kind of objectivity and distance in description and involvement of researchers actualizes similar distance of research subjects that are constructed as scene. While there are, as mentioned, writing tropes that make agents of the authors, there is nonetheless a clear latent agency demanded by science writing: the researchers are the means to and of data—the agent and its acts. There is potential for complete inanimation of Stewart, Pattengale, and Leder as discursive tools of biomedical research, and such potential is actualized in the mice constructed as scene.

Transgenic mice are *actually* inanimated—they are places, sites of action, containing the agent and its acts within themselves. They are, as Burke would say, the container of the things contained (*Grammar of Motives*), captive from birth until death. Stripped of their animation, of their animality, mice in this *entelechi* study, like their kin elsewhere in biomedical narration,

⁴ Rhetorical constructions of genes as agents during the time Stewart, Leder, and Pattengale published this study was routine. See Mary Midgley's *The Solitary Self*, and Lewtonin, Rose, and Kamin's *Not in Our Genes*.

are constructed into containers, into places of controlled and observed disease, into pocket watches of elapsed malignancy, and into precursors to patented property. The potentiality of agency in the narrative of biomedical progress expresses itself most fully in its nonhuman experimental subjects; the objectivity demanded as potential in the human animal is realized in the objectification of the nonhuman animal. Scene is in keeping with agency.

Biomedical writing structures its authors to objectify both themselves and their subjects. The motive revealed by the agency-scene is to objectify beings—including human beings—whose lives as *subjects* could problematize their use in biomedical research. Stewart, Pattengale, and Leder's justification for injecting mice with modified genes that would grow cancer in their bodies is to attend to “incomplete knowledge” so that biomedicine may progress. But the language reveals another purpose: it frames the gene as agent, it frames the mice as “living organisms” in which actions happen, and it dissolves the human agent in a grammar of agency that refuses to answer *whose* notions and tested *by whom*. The motive of this research and other research like it is to generate the distance necessary to permit this kind of experimentation. Researchers must have the potential to be mere inanimate instruments and experimental subjects must be actualized inanimate objects in order to permit scientific violence against feeling beings that sidesteps researcher responsibility and neglects nonhuman consideration. The one engaging in violence must have the *potential* to distance, a kind of latent grammatical dissociation, while the being acted against must *actually* be distant for the act to be permissible. Dooming a mouse and her offspring to cancer by the intended actions of human beings demands distancing that the genre and grammar of biomedicine provides. But this distance is also necessary as part of how biomedical data can be observed “objectively”; researchers must construct the relevant distance from their data and experimental subjects so as to avoid methodologically inappropriate

intersubjective closeness. And researchers are trained to be distant, sometimes at very young ages, something I will explore in greater detail in chapter three by analyzing a neuroscience presentation performed for a child audience. This is at least one rhetorical motive of biomedical research, and this motive enables the actions necessary to narrate biomedical progress by constructing both humans and other-than-humans as vehicles for knowledge production either as agency or scene.

The genre conventions of science writing, as detailed by rhetoricians of science, encourage the kind of researcher-subject detachment that precludes asking crucial ethical questions about the permissibility of experimenting on feeling beings (Solomon). Alan Gross explains that, “[r]egardless of surface features, at its deepest semantic and syntactic levels scientific prose requires an agent passive before the only real agent, nature itself” (17). Charles Bazerman informs us that “[o]ne peculiar aspect of the accomplishment of scientific discourse is that it appears to hide itself . . . to write science is commonly thought not to write at all, just simply to record the natural facts” (14). “Scientific formulations,” he writes, “giving us no direct access to things in themselves, seem to do all the social work of being human” (294); it is biomedical descriptions, experiments, and data, for instance, that are the apparent agents in the social construction of scientific knowledge. “Moreover, these formulations have given us unimagined dominion over the objects and creatures that surround us” (292), Bazerman continues. When coupled with discursive exclusion and intimidation, the work of science is “to advance itself” (294). The conventions of biomedical report writing not only restyle the agent of discourse from human researcher to nonhuman data while reproducing power over human and nonhuman beings and processes, but they are also clandestine about doing so.

The motivation for rhetorical objectification in this research, I have argued, is to provide the distance necessary to jettison empathy and ethical concerns in the face of institutionalized experimental violence. Yet there is a further element that requires more explicit interpretation in order to better grasp the means of objectification necessary to narrate biomedical knowledge progression. Burke's concept of terministic screens will contribute to a broader understanding of how reflected and deflected realities of the animals involved in this biomedical drama serve to perpetuate their use-value as science objects by creating further distance.

1.3 Terms of Experiment

For Burke, the opposite of a dramatistic approach to language is a “scientific” approach, which “begins with questions of *naming* or *definition*” (*Language as Symbolic Action* 44). And while Burke is quick to acknowledge no mutual exclusivity between the two approaches to language (definition itself is a symbolic act) he proposes this distinction to account for the difference between descriptive and normative, definition and act, between conveying information and symbolic action in a given discourse. In this vein, Burke talks of the “necessarily suasive nature of even the most unemotional scientific nomenclatures” (45). While above I have discussed the rhetorical implications of the biomedical report, here I am more precisely concerned with what Burke calls terministic screens. As Burke explains, “[e]ven if any given terminology is a *reflection* of reality, by its very nature as a terminology it must be a *selection* of reality; and to this extent it must function also as *deflection* of reality” (45). When a thing is named, its name supposing to reflect a reality about that thing, that name serves also to deflect other realities, other meanings, also attributable to that thing. A term like “model,” applied to a mouse, for instance, seemingly innocuous and commonplace, can serve to deflect other understandings of

the being it names in its reflection of a biomedical reality. I begin this section with an exploration of the particular screens applied to experimental animals⁵, and what such screens provide for biomedical narrative. Finally, I elaborate on what rodents mean for us in a broad context of modernity, then move to rhetorical understandings of their meaning in biomedicine, and what can be gained by understanding the words “mouse,” “rat,” and “rodent” as terministic screens within the progress narrative.

Particular terministic screens are an integral component of the biomedical negotiation of the meaning of rodents. The screen “living organism,” for instance, functions to deflect a reality about rodents that disturbs the biomedical narrative, the reality that rodents and humans *are* different. How different and in what ways different and which differences matter remain a subject for discussion in chapter two. Importantly, however, the term “living organism” glosses these questions. Stewart, Pattengale, and Leder write of their purpose, “knowledge concerning [these genes’] action in a living organism is, at best, incomplete” (627) and that “we wanted to assess the effect that the activated *myc* gene might have on the normal process of development in a living organism” (634). In writing so, they reflect, by selecting mice as suitable research subjects for humans, a reality that what matters most is that they, like us, are living organisms, and so their bodies will respond to specific scientific medical interventions like ours. While it is not explained why it must be mice who must be the living organisms (and not merely cell cultures) it is rhetorically effective to remind the reader that, like humans, mice, too, are “living organisms.” Questions of translatability between different beings is discursively lost by the

⁵ Throughout this thesis I use the terms “nonhuman animal,” “other-than-human animal,” and “animal.” I realize that the word “animal,” as Jacques Derrida has pointed out (x, 32), is itself a screen that groups an inordinate amount of living variance into a single category, whose only apparent unity is that they are not us. I take my terminological problem here to be that it is difficult to escape this screen, and thus what it reinforces or performs. My choice here in this thesis is to be variable in my usage for two reasons: for readability, and to be disruptive enough to hopefully remind the reader, on occasion, of just how problematic our term for this massive class of different beings is.

unification the term “living organism” manages. Paradoxically, researchers must balance this unity with the division necessary to begin such research in the first place; nonhuman animals must be similar enough to us to justify using them as models for ourselves, while different enough from us that such research is morally acceptable (Rader 22). Again, this kind of likeness-unlikeness is what Burke would name as the discontinuity principle in the disassociation of ourselves from the animals who model us.

“Oncomouse™” has tremendous screening power for biomedicine. It reflects the reality of a perspective centered entirely on the biomedical worth of such mice. Like the screens of “pork” and “beef,” which deflect the reality that *pigs* and *cows* end up in our stomachs, “Oncomouse™” reflects a reality of transgenic mice in relation to our cancers; such screens construct an anthropocentric use-value onto other beings. Because the screen is trademarked, the reality reflected is that mice are “natural animal-research tool-inventions” (Robins), beings who can suitably embody the *entelechia* height of instrumental animal use-value. Not only can we relate mice strictly to human disease, but we can relate them strictly to our property laws. Deflected by “Oncomouse™” is any sense of mice being their own, of having value unrelated to the ability to model us. Much like the agency-scene ratio, this screen is perfectly objectifying, or, as Burke would say, “rotten with perfection” (“Definition of Man”). Much of the same can be said of the ubiquitous biomedical screen “model.” Realities reflected by this term are again those of anthropocentric use-value. Again, nonhuman worth is a function of what they can do for us as objects of research. And like “living organism,” the term precludes puzzlement over what relevant similarities we bear to rodents, since “model” functions to reflect a reality about rodents that they bear a certain Burkean continuity to us, but only in ways experimentally relevant, and not, importantly, in ways morally relevant.

The most significant screening, however, is that accomplished by the seemingly innocuous terms “mouse,” “rat,” and “rodent.” Rats and mice crowd medical science. Harkness and Wagner explain that, “[b]ecause mice are small, prolific breeders; are easily and economically maintained in large populations; possess great genetic diversity; and are well characterized anatomically and physiologically, they are the most widely used vertebrate animal in biomedical research and testing” (58). Yet “rodent,” “mouse,” and “rat” capture much more than scientifically useful fecundity and enochlophilia: Davies explains that the kinds of realities reflected by these terms have to do with a threatening challenge to modernity. Mice and rats, as impure, uncontrollable beings, threaten to dissolve the boundaries integral to the maintenance of modern systems, as “[t]heir monstrosity emerges from their apparently limitless potential for reproduction and consumption; for their unchecked excess” (270). Rodents represent more about ourselves than epigenetic studies confess; meanings of excess reproduction and energy consumption, of piles of waste and cannibalism, seem to reflect ideas about what it sometimes can be to be a modernized human as we fret over overpopulation, energy crises, climate change, pollution, and exploitation. As symbols of anti-systems—that which complies poorly to regulation and control, and is poorly predicted and chaotic—mice reflect truths about fears we have of our own bodies as well, such as the inability to predict cancer, its excess growth and consumption, its apparent ubiquity so apparently correlated with modernization, and its resistance to cure. In some sense, then, it seems as though rodents are not only models of us with cancer, but of cancers in our modernized world, both literal and figurative. It seems difficult indeed to include such a being—a monster, as Davies calls it—into the realm of moral consideration that would exclude her/him from the very experimentation aimed to address such

concerns. The very screens of “mouse,” “rat,” or “rodent” generate an important rhetorical distance for researchers who use them.

The rodent is at once the emblem of modernity as one of the only animals who can flourish in and sustain our modernist presence on the earth by thriving as much in our streets as in our biomedical laboratories and academies, and the patron of the anti-system as the animal “gnawing through the walls of man-made structures, [who] in modernism augur the collapse of boundaries, especially the boundaries of meaning” (Davies 270). Like a Greek god who at once represents Love and War, or pharmaceuticals that both cure and poison (Derrida qtd. in Rinon 370), the rodent represents both creation and destruction, reproduction and illness. Haraway writes of the Oncomouse™ that, “[a]lthough her promise is decidedly secular, s/he is a figure in the sense developed within Christian realism: S/he is our scapegoat; s/he bears our suffering; s/he signifies and enacts our mortality in a powerful, historically specific way that promises a culturally privileged kind of salvation—a ‘cure for cancer’” (*Modest_Witness* 79). The Christian symbolism of experimental rodents lies in their bearing of scientific progress and salvation of those they model and atoning for the malignant sins of modernity while they are simultaneously persecuted for those human traits endemic to modernity—prolific reproduction, waste and pollution, cannibalistic exploitation, and the threat of rampant disease. Rodents are both savior and pest of modernity, and they face both sacrifice and extermination, not unlike a Jewish Christ.

In her rhetorical research, Monika Cwiartka expands on questions about the discursive strategies used by researchers and institutions in deflecting the realities of mice in biomedical settings. In analyzing a particular kind of nonhuman animal research, that of genetic predisposition to aggression, she asks, “[h]ow, exactly, does one use a mouse in a controlled research setting to model stabbing someone in the chest with a pitchfork, or forcing a woman to

undress at knife point? Put differently, how does a research community interested in the biology of aggression (or other kinds of behavior) decide what aspects of mouse embodiment, of mouse behavior, to count as data?” (76). Cwiartka explains that the meanings of mouse behavior in the scientific research setting is made up discursively, that what gets to count as a category of translatable human behavior is negotiated across researchers and institutions. “Normally,” Cwiartka argues, “the fact that language is doing important work in making animal data relevant to the human situation is obscured by the momentum of research, by collective agreement about the nature of the problem, the models that should be used, how agents should act on these models in experimental scenes, and allowable interpretive strategies” (108). This collection of obfuscating factors is an important part of the narrative of biomedical progress—research momentum, consensus, modeling, experiments, and what is permissible are part of biomedical “progress.” One of the rhetorically significant implications for this narrative, then, is that it obscures the kind of rhetorical interpretations that can problematize its own motive, agency, scene, and screens, especially those involving nonhuman animals.

Those terministic screens in biomedicine—“living organism,” “Oncomouse™,” “model”—in tandem with the screens of “rodent,” “rat,” and “mouse,” come to reflect a powerful objectified reality for a large and diverse group of beings used in biomedical research. Rodents are paradoxes: at once vermin undermining the foundations of modernity, while simultaneously propelling the progress of that cornerstone of modernity, biomedicine, by representing us. Mostly, however, the terms “rodent,” “rat,” or “mouse” reflect a reality about a being who is threatening, disgusting, and (literally) beneath us; deflected are realities such as feeling, caring, interesting, playful, or worthy. These meanings have existed, of course, long before biomedicine. Such meanings are cultural, and old. One has merely to consider how “rat” and “rodent” is

applied in times of war against the enemy to understand it is a term of the deepest cultural fear and loathing (Patterson). While biomedicine is not responsible for such meanings of rodents, biomedicine seems to take advantage of such meanings in a troubling way: what concern can we afford experimental beings who are subjected to such deep terministic loathing? Is the terministic functioning of “rodent” in a biomedical study like Stewart, Pattengale, and Leder's so different from “black” or “negro” in the Tuskegee Syphilis Project? In each case, screens reflecting cultural fear and loathing seem to put audiences at ease with the notion that these are beings who can be experimented upon for *our* interests: they are *just rats* and *just blacks*. Like the construction of mice as scene and researcher as agency, the screens applied to these experimental beings facilitate a distance needed for their use that both avoids moral concerns and affirms methodological appropriateness.

The University of British Columbia, itself home to almost 200,000 research animals as of 2014 offers a statistical breakdown of its experimental nonhuman use:

Table 1. Animals used in research at UBC

Animal Type	Number	Percentage
Rodents	113,894	62.53%
Fish	39,183	21.51%
Reptiles & Amphibians	23,991	13.17%
Birds	1,358	0.63%
Small Mammals	1,371	0.75%
Large Mammals	1,138	0.62%
Marine Mammals	1,383	0.75%
Grand Total	182,115	99.96%

Source: “UBC Animal Research Statistics.” *Animalresearch.ubc.ca*. University of British Columbia. N.d. Web. 10 April 2016.

Why has “rodents,” making up more than 60% of all research animals, been distilled out of the category of “small mammals,” of which it is undoubtedly a part? Rhetorically, in the context of what I have argued about “rodent” as a terministic screen in biomedicine, separating “rodents” from “small mammal” functions, I believe, to persuade those reviewing these statistics to feel more comfortable with the volume of animal experimentation conducted at UBC. After all, *most* of the animals are *rodents*. This evokes less concern, for the reasons I have described above, than were the graph to correctly amalgamate the 1,371 “small mammals” into the nearly 114,000 “rodents” as a matter of categorical consistency. Were we to learn that UBC experiments on 115,000 small mammals each year, uncomfortable questions could be asked. These questions can be avoided simply by employing the screen of “rodent,” however awkwardly this is done, because of the rhetorical advantage that using a term for a culturally loathed being provides.

Harkness and Wagner write, “[d]espite a well-known association with plagues, garbage, and sorcery, domestic rats, if handled gently, make quiet, clean, easily trained pets” (67). Rodents are sites of apocalyptic disease, of putrid waste, and of disturbing, supernatural arts—yet they can be *pets*, a screen reflecting ownership and control, necessary features of biomedical use of sentient beings. Mice and rodents breed quickly, live modestly, and are small. This makes them suitable laboratory residents. But they are also loathed. And biomedicine can, and does, wield such loathing to its advantage—fewer questions are asked, less fuss is made, less legislation passed regarding beings who both threaten our modernity and sustain its progress.

1.4 Conclusion

For Burke, words are symbolic actions. Stewart, Pattengale, and Leder's transgenic mouse study itself is as much a set of actions as the injections, the modifications, and the killings are—this

study is a set of symbolic actions against other mammals. Burke's dramatism sheds light on how Stewart, Pattengale, and Leder's study is motivated by the desire to achieve the distance necessary for continued *entelechial*, transgenic experimentation. It is instruction and recommendation for the development of a particular distance between researchers and their other-than-human research subjects in order to narrate biomedical progress.

The creation of this distance is not limited only to the report written by Stewart, Leder, and Pattengale, but is rather one manifestation of distancing and objectification needed for scientific knowledge production. Attempts to overcome such rhetorical conventions in the genre or in the research itself is subversive. “The accusation of anthropomorphism is so strong,” writes Latour, “that it paralyzes all the efforts of many scientists in many fields—but especially biology—to go beyond the narrow constraints of what is believed to be ‘materialism’ or ‘reductionism.’ It immediately gives a sort of New Age flavor to any such efforts, as if the default position were the idea of the inanimate and the bizarre innovations were the animate” (*Compositionist's Manifesto* 481). Ascribing characteristics to those other-than-human, characteristics such as agency or act, that purportedly belong only to the human realm becomes a real barrier to scientists who attempt or wish to attempt constructions of the nonhuman that transcend parochial inanimating language. The distancing we have seen in this chapter is part of a much larger reductionist discourse in science that is foundational to its ability to observe, experiment, and predict for the sake of progressing knowledge.

The rhetorical construction of the murine scene and researcher agency in Stewart, Pattengale, and Leder's study enables a distancing that precludes moral consideration and responsibility of nonhumans involved in experiments, and the apt deflection of realities by terministic screening, both cultural and biomedical, contributes to the targeting of a particular

family of animal for biomedical purposes. Human researchers become passive agency for biomedical agents of interest—data—while experimental mice and rats are constructed as the place and time of events of biomedical interest. As researchers are inanimated by the linguistic passivity demanded by this genre, their responsibility as agents of scientific and symbolic violence is obscured. Indeed, it is difficult to quantify the responsibility of researchers in acts of violence such as this when they are among the thousands adhering to the conventions of a particular genre that takes advantage of the deep cultural terministic fear and loathing of rodents as part of a methodology in biomedicine. I believe that this seminal, *entelechial* piece of biomedical research has set a tone for experimentation rhetoric, much as it has set the tone for animal patents and transgenic pursuits in biomedicine.

Experimental mice are objectified in a way that inhibits researchers' and audiences' moral discomfort with their use as models for us, and this objectification is a trope necessary in the narrative of biomedical progress. Knowledge production in biomedicine as it is currently understood demands such animal use as part of methodology; without such objectification, methodologies that employ the bodies of other beings in this way would be, I think, almost impossible to bear. Perhaps that is a motif in any narrative of progress: that those who threaten to impede it, or those who promise to propel it, are the objects for its flag bearers to use. For us, rats and mice offer to do both.

Chapter 2: Monstrosities and Incapacities

In this chapter I argue that two groups of biomedical researchers and advocates who disagree about the efficacy of animal experimentation and united in their rejection of serious animal ethics in biomedical research. Both groups have diverse representation by medical researchers, neuroscientists, psychologists, molecular biologists, doctors, veterinarians, philosophers, historians, and political scientists. In chapter one rhetorical devices were used to create distance between researchers and their experimental animals. In this chapter these discourses reveal a motive to perpetuate and communicate a narrative of biomedical progress by instrumentalizing critics of biomedicine and experimental animals as a function of occupational psychosis and trained incapacity unites these seemingly staunchly opposed researchers.

I begin this chapter with an explication of Burke's notions of occupational psychosis and trained incapacity, which will guide my interpretations of a certain myopic biomedical rhetoric of instrumentalization present in the two groups of biomedical researchers that advances the progress narrative. "Instrumentalization" in this thesis captures the occupational way that biomedical researchers rhetorically construct both human and nonhuman animals into the instruments and methods of research in order to produce and communicate knowledge. In the first section, by applying occupational psychosis to the discourse of those who defend animal experimentation, I interpret how biomedical researchers instrumentalize animal liberationists critical of nonhuman experimentation by making monsters of them, and interpret a motive that biomedicine need not consider—and could avoid—the monstrous politics of animal liberation so as to maintain the progress narrative. Critics of biomedical experimentation point out that a progress narrative that seems to require experimentation can be countered with an argument for

moral progress, progress that has been made not only historically in the way we treat humans, but also how we treat those other-than-human (Singer *Animal Liberation*). In the second section, by applying trained incapacity to the discourse of those who contest, in scientific terms, the efficacy of animal experimentation, I interpret how biomedical researchers who seem to defend the interest of animals instead perpetuate understandings of animals in terms of instrumental use value, while suggesting that, again, biomedicine need not consider the concerns of animal liberation. Despite their apparent differences, both discourses reject the inclusion of animal liberation into the biomedical narrative, and both discourses perpetuate and maintain the progress narrative by instrumentalizing their respective objects of focus: critics of biomedicine and experimental animals.

2.1 Occupational Psychosis and Trained Incapacity

Burke's related rhetorical concepts of occupation psychosis and trained incapacity can be used to interpret the motive uniting two biomedical discourses that appear incommensurable. Burke explains of occupational psychosis, a term from John Dewey, that it “corresponds to the Marxian doctrine that a society's environment in the historical sense is synonymous with the society's methods of production” (*Permanence and Change* 56). The term is meant to capture the ways in which a culture's or individual's orientation to, or interpretation of, the world is constructed by an occupational lens—one's occupation, for instance, will dictate how one perceives, interprets, and acts within the world. Hill explains, “Burke meant that everyone had a certain orientation to the world, and that a person's occupations would determine his or her reality, ‘since they focus attention on different orders of relationships’” (7). A culture whose primary mode of economic sustenance is hunting, for instance, would symbolize such occupational means in non-

occupational cultural activity—a matrimonial ritual might include imagery or staging of the man hunting the woman where the “woman will be ritually *seized*” (Burke, *Permanence and Change* 56, original emphasis). As Burke notes, Dewey did not mean “psychosis” in the psychiatric sense, but rather to denote a “*pronounced character of the mind*” (*Permanence and Change* 59). One might equally call it “occupational orientation.” An important feature of occupational psychosis is trained incapacity. Burke explains that this refers to a kind of fitness one has to a given context that is rendered incapacitating when the context changes faster than a change in training can (14). A prizefighter's bellicose attitude could serve well in the ring, but poorly during a badminton match. “One's very abilities, then,” writes Burke, “can function as blindness” (14). The training one receives to act in and on the world in a certain way can parochially limit how one operates in a renewed or changed context.

The application of these concepts to biomedical discourse relies on Burke's understanding of the rationalization of science, which is the control over the forces of technology or machinery, and of making technologies and machines out of both the nonliving and living. “Its genius,” writes Burke, “has been called experimentalism, the laboratory method, creative skepticism, organized doubt. It has an occupational morality all its own, though at present this is more forcefully revealed by its contribution to the breakdown or cancellation of traditional moralities than by positive psychotic emphases” (64). Because the occupational morality of experimentalism dictates a refined, deliberate tool usage by way of technological control, the psychosis of experimental science will mean that it is symbolically represented elsewhere. Darwin, for instance, was enveloped by this psychosis when he argued that our cognitive, emotional, and moral characteristics were essentially “instruments” or “weapons” in the struggle for existence (64). Experimental tool use has become such a prevailing method of knowledge

production that even an understanding of how we came to be in the world is cast in terms of incremental development of our biological “tools”. While Burke notes that such a psychosis reveals its normativity most plainly in the breakdown of traditional moralities, it nonetheless orients one to a morality of instrumentalization: the normative creation and use of tools out of living beings.

Occupational psychosis and trained incapacities can have dire effects. In the previous chapter, I discussed Burke's notion of *entelechy*, the propensity to seek symbolic perfection of those goaded by the “spirit of hierarchy” to achieve the ultimate end of a technological aim (Hill 6). Projects are followed to their completed perfection—the height of their development—regardless of anticipated outcomes, if any *could* be anticipated. Transgenic mice are an example of biomedical *entelechy*. Hill further explains, “[e]veryone has trained incapacities and occupational psychoses—terms that are somewhat interchangeable—but those of the engineers, technocrats, capitalists, etc. pose the greatest threat to humanity through the relentless entelechial demand for technological progress at the expense of humaneness and the environment” (7). Part of the psychosis is the inability of those who pose such threats to perceive their work as threatening. I emphasize here that those psychoses of biomedicine pose significant threats to humaneness and the environment—and to that beyond humanity—by way of transgenic pursuits and animal experimentation more generally. This particular psychosis of technology, experimentalism, and science is what Burke called the “master psychosis” and that most in need of “corrective symbolic change” because of the power of science to so seriously affect not only those enveloped in its instrumentalizing methodologies but also everyone else, including other-than-humans (Hill 8).

For my method in this chapter, I will be interpreting each discourse by applying these two related Burkean concepts to key texts in order to demonstrate that the occupational psychosis and trained incapacity shared by the opposing groups in fact unites them in a rhetorical motive to make instruments out of biomedical critics and experimental animals so as to communicate and perpetuate the progress narrative by rejecting animal ethics.

2.2 Monster-Making and the Communication of Biomedical Knowledge

The discourse I analyze in this section is significant, I argue, because it exemplifies how monsters are made of critics of biomedical experimentation in order to maintain a progress narrative, accomplished largely by an attack on *ethos*. The application of occupational psychosis to my artifact, my object of study, provides a method in this section of precisely naming the rhetorical constructions so integral to the progress narrative that also function to persuade audiences of the incompatibility of animal interests and biomedicine.

My artifact in this section is *Why Animal Experimentation Matters: The Use of Animals in Medical Research*, a book written in support of experimental animal research, published by the Social Philosophy and Policy Foundation (SPPF) journal. The journal is published by Cambridge University Press and with a paid circulation of more than 7900 it is the most heavily subscribed English-language philosophy journal in the world (*Socialphilosophyandpolicy*). It also solicits the work it features (*sppfpb*). Edited by Ellen Frankel Paul (also then-editor of the journal) and Jeffrey Paul, *Why Animal Experimentation Matters* is a collection of essays justifying the use of nonhuman animals in biomedical experiments from various disciplinary perspectives: political science, history, sociology, anthropology, veterinary medicine, neuroscience, biomedical ethics, integrative biology, physio-anatomy, medicine, and philosophy.

I analyze key excerpts from several authors in this text in order to demonstrate the presence of occupational psychosis and how it makes monsters of biomedical critics that can be used to perpetuate the progress narrative.

The *ethos* of biomedical critics is challenged in *Why Animal Experimentation Matters*, founded on occupational psychosis in such a way as to make monsters out of biomedical critics, and these rhetorically constructed monsters do instrumental knowledge-work for biomedical researchers. Alan Gross explains how the Aristotelian rhetorical concept of *ethos* regularly features in scientific discourse: “science is no exception to the rule that the persuasive effect of authority, of *ethos*, weighs heavily...the progress of science may be viewed as a dialectical contest between the authority sedimented in the training of scientists, an authority reinforced by social sanctions, and the innovative initiatives without which no scientist will be rewarded” (12). In *Why Animal Experimentation Matters*, Peter Singer, bioethicist at Princeton, who argues for the equal consideration of interests for all sentient beings, is one influential biomedical critic made monstrous (*Animal Liberation*). “Singer has become a controversial figure,” editors Paul and Paul write, “[r]eligious activists objected to Singer's frequently outrageous statements in support of infanticide and euthanasia” (8). Morrison suggests that Singer's focus on the harm done to animals in brain research is underpinned by a bigotry towards the mentally ill and those with addictions, as well as a “subconscious desire to destroy the research that benefits the one organ, the human brain, that most differentiates us from animals” (58). Charles S. Nicoll, a professor of integrative biology at Berkeley, and Sharon M. Russell, once a researcher in the Department of Physiology-Anatomy at Berkeley, both write of Singer that, “[the] fact that Singer regards his own species with something less than great regard is revealed by the following statement: ‘[I]f... children [were given] a pleasant year before being humanely slaughtered, it

would seem that the gourmet who wished to dine on roast human child would have as good a defense of his practice as those who claim that they are entitled to eat pork because the pig would not otherwise have existed” (167)⁶. Like many bioethicists, Singer does indeed argue in favor of voluntary and non-voluntary active euthanasia of all ages in certain circumstances, and attempts to denude the hypocrisy of those who eat animals by challenging moral assumptions of the overriding value of human life. However, the audience of *Why Animal Experimentation Matters* does not learn of his nuanced utilitarian positions regarding when to end human life, nor of the methodological function of such thought experiments in western analytic philosophy, but hears, rather, of a leader of a movement in opposition to a particular biomedical methodology who preys on the mentally ill and addicted, champions killing humans and cannibalizing our youngest, and seeks to disintegrate the modernist boundaries between human and animal by criticizing brain research involving nonhuman animals. Such discursive strategies render Singer's *ethos monstrous* in a way instrumental to the communication of the biomedical narrative by constructing serious critics of biomedical experimentation as dissuasively out of touch with any semblance of reasonable, modernist human values.

As Paul and Paul, Morrison, and Nicoll and Russell rhetorically construct Singer into a monstrous event like that of the OncomouseTM, serious animal ethics becomes a threatening anti-modernist politic. The need to persuade audiences of the necessity of constructed biomedical monsters such as the OncomouseTM is reflected in the use of another kind of monster-making achieved through this assault on *ethos*. Such monsters “in the 20th and 21 [sic] centuries... seem to demonstrate a more explicitly political identity, fracturing the humanist assumptions of Enlightenment thought... challenging totalizing conceptions of both nature and culture in

⁶ Brackets and ellipses in quoted section of quote are original.

contemporary biology” (Davies 269). Singer, in fact, has denounced the Humanist movement as speciesist (“Taking Humanism Beyond Speciesism”) as have others (Cushing), its entire moral framework resting solely, unjustifiably, on the moral superiority of human interests. Animal liberation has indeed become a vocal political force, and boundaries that uphold distinctions between human and nature or human and animal so necessary to justify distinct use and treatment—at least, rhetorically if not in practice (humans are, too often, treated like nonhumans)—in biomedicine and beyond have been relentlessly contested by this political force. Such a movement, as a monstrous ideology, “arriv[es] from the boundaries of conventional knowledge, representing, at least initially, the limit to the order of things” (Davies 269). Singer and other animal liberationists are part of a borderland politic, a cohesive political discourse that contests, but still benefits from, human-animal boundaries integral to modernity without themselves being entirely apart from modernity. Adrian R. Morrison, professor of veterinary medicine at the University of Pennsylvania writes that, “my work and that of many fellow scientists has come under incredible scrutiny and worse. The reason, of course, is... that there are those firmly opposed to using [nonhuman animals], even when human lives are at stake. At the heart of that opposition, in my opinion, lies evil” (49). The evil of opposing animal experimentation is likened to totalitarian regimes: “leaders of the animal rights movement exemplify this suspect morality [which lead to] the terrors of both Nazi Germany and Soviet Russia, in which millions of human beings lost their lives” (50). Morrison generates rhetorical force by comparing those who put biomedical research under “incredible scrutiny” with those responsible for genocide, global warfare, and mass famine, which are, ironically, staples of modernity. This borderland politic “elevates the views of misanthropic charlatans who would stifle the scientific advancement that promises healthier lives for our children and grandchildren”

(Morrison 72) and displays “Anti-science and [m]isanthropic [s]entiments,” (Nicoll and Russell, 166). Yet for Singer, and other animal liberationists, progress is a matter of moral rather than biomedical advancement—the enveloping of nonhuman beings into our moral circle—as “[t]here is nothing sacred about the right to pursue knowledge” (*Animal Liberation* 92). Animal liberation is a borderland politic that, like the rodents it seeks to include within it, disintegrates the boundaries essential to a modernist ethic and progress narrative, threatening what modernity promises to our hypothetically disease-ridden hypothetical progeny at the expense of those not human. This borderland politic thus becomes an instrument to maintain the biomedical progress narrative by being constructed as monstrous in its opposition to biomedical research.

Nicoll and Russell in particular advocate for a strong program of progress in knowledge that weds biomedical normativity with understandings of evolutionary biology, and this reveals a powerful psychosis that constructs critics into monsters in order to reinforce the hegemony of biomedicine. They state their position most clearly when the researchers survey a group of participants at the “Rally for the Animals” in Washington DC in 1990. After describing the demographic as mostly (sub)urban, liberal women with pets, they move to analyze the findings:

Perhaps the most revealing statistic from the data... is the fact that only 20 percent of those interviewed had children. In a group with similar demographics in the general population, at least 80 percent would have children. It seems, therefore, that animal activists are very fond of animals but not so fond of children, which is consistent with the fact that they do not favor their own kind over other species. From a Darwinian perspective, this attitude shows that these animal advocates are adaptively unfit.

Inasmuch as only a small percentage of them have children, and children generally adopt

the sentiments of their parents, it seems unlikely that animal activists will become a dominant proportion of modern society. (166)

Here, the psychosis of biological sciences, coming to the defense of animal experimentation, generates an evolutionary reading of animal activism and activists. Nicoll and Russell's interpretation of what it means to be a fit, modern woman in society is not only having a fondness for children, but of having them—that somehow a woman without a child is, from the perspective of an evolutionary biologist, a failure. Even more, a woman without a child is by definition misanthropic, a kind of hateful evolutionary anomaly grating against the ingrained compulsory love a social mammal must feel for her peers “[b]ecause it is an evolutionary necessity to regard one's own kind as more important than members of other species (especially for social species)” (165). Such women, then, become another kind of monster: one who threatens biomedical and modernist progress by transgressing the feminine boundaries of her species. Though Burke noted that the occupational morality of experimentalism was most forcefully revealed with its cancellation of traditional moralities, here we see a glimpse of the more explicit normativity of experimentalism⁷.

Susan Kalev was one such woman present at the March for Animals rally in Washington DC in 1990, used by Nicoll and Russell to illustrate their occupational morality. Born in Hungary during the Holocaust, her father, sister, and other family members were killed at Auschwitz (Patterson 143). After earning a Master of Social Work in New York in the 1980s, she worked as a family and adoption caseworker for a number of years before moving on to social work with those suffering from cancer, and finally as counselor for those suffering from HIV/AIDS (144). Since Kalev believes that “the mistreatment of people and the mistreatment of

⁷ One might also note the best-selling works of popular science values writer Sam Harris, such as *The Moral Landscape: How Science Can Determine Human Values*.

animals are connected” (144) this is one reason why, as a Holocaust survivor, she views protesting against nonhuman abuse at a rally as one method among many to protest, also, against human abuse. But “science has special topics of its own, unique sources for its arguments,” such as “precise observation...prediction [and] mathematicization,” writes Gross (11). As a statistical figure part of a mathematicizing *logos* that attempts to persuade an audience of experimental value by demonstrating the adaptive unfitnes of opponents, Kalev and her reasons for attending such a rally are lost. She is grouped into an amorphous, failed collection of mostly (sub)urban, liberal women with pets and no children who grate against “our” evolutionary biological moral imperatives.

Crucially, like Singer, Kalev and the other women she is grouped with challenge modernist assumptions about nature and culture in contemporary biology; they dwell in a borderland between reproductive, speciesist humans who are deemed to contribute to biomedical knowledge, and a nonhuman force that cares nothing for humanity nor its progress narratives. While Singer, a man, condones eating “our” young, these women do not make more. And what mitigates the contempt for these monsters is the hope that they will simply die out, since their prophylactic ideology—unlike their compulsory genetic love for their own species—cannot be inherited. This monster-making of human critics, like that of transgenic mice, is part of the essence of the biomedical narrative; just as experimental monsters like transgenic mice are used and made in order to *produce* biomedical knowledge, human monsters like animal liberationists are made in order to *perpetuate* it.

A rhetorical motive that begins to reveal itself is that audiences are persuaded to consider serious animal ethics as entirely antithetical to biomedical knowledge production. How could a monstrous ideology possibly benefit an enterprise of human betterment—except, of course, as a

point of stark contrast? Animal liberation becomes a *reductio ad absurdum* of the serious consideration of animal life in the biomedical sciences. Editors Paul and Paul even go so far as to include a chapter titled “Animals: Their Right to Be Used” by Engelhardt Jr., a professor of medicine and philosophy at Rice University, in which he argues animals have a right to be the objects of use by human beings *in any capacity whatsoever*, including cockfights (178). This seems as extreme an argument as any Singer makes. Those who take seriously the interests of other sentient lives are set up to be at odds with biomedical research and human health; it hardly seems possible to consider how biomedicine could fruitfully engage with animal liberation discourse. Audiences are sought to be persuaded that biomedical progress demands an unapologetic, totalitarian use of nonhumans rather than the serious consideration of their interests.

The occupational psychosis of biomedical researchers becomes most apparent in the monster-making of human beings because it instrumentalizes them in the narration of biomedical progress. Monsters are the instruments of biomedical experimentalism. Women who protest for other-than-humans are constructed as mathematized, detestable evolutionary failures, and a philosophical animal liberationist is constructed as endorsing the consumption of infants. The imposition of a tool metaphor is the psychosis of experimentalism, and I suggest that the occupational psychosis of *biomedicalism*, if it can be so called, is a regular imposition of a monster metaphor. Biomedical researchers, taking such psychosis to its *entelechi*al end communicate the produced knowledge through the monsters they produce. Singer becomes a monster, Kalev becomes a monster, and mice become monsters because that is the *entelechi*al momentum of an experimentalist orientation whose knowledge production is predicated on biotextual interpretation.

Monster making plays an important role in biomedical knowledge communication both as part of a transgenic methodology, but also in its construction of critics of experimentation. Davies elucidates, “[m]onsters are biotextual beings[; t]hey are of biology and text, material and semiotic, things and words” (268). Monsters function to persuade as objects of information conveyance in their versatility across boundaries, and the authors in this discourse construct and make use of monsters in order to convey information about the progress of biomedicine. Haraway explains of the Oncomouse™ that what makes her/him a monster (“vampire”) is being both an invention—a text—and a living organism—a biological being—and that such monstrosities have “category-crossing work to do” (79). Like Frankenstein's Creature, monsters transgress and reveal constructed human boundaries, the maintenance of which is important to the supposed functioning of an ordered society. Monsters do violence to these boundaries and are threatening because of it. Davies explains of monster-making that it “re-articulat[es] disgust and dread in considerations of contemporary biotechnology” (268). As we saw in chapter one, biomedicine makes use of ostensible monsters as part of a narrative of progress: they comprise a methodology as beings who are able to model us in experiments—through feats of technological and rhetorical manipulation into new, borderland life forms—while lacking the qualities needed that might evoke the compassion that inhibits such research. Biomedicine both makes its own by genetic modification, and relies on those already made by available cultural screens, such as “rodent,” in order to inhibit interspecies empathy that could complicate such research. And monsters have served such biotextual purposes for centuries in western thought. Daston and Park explain that monsters portended significant meaning for Europeans in the fifteenth to eighteenth centuries, functioning as instruments of theological knowledge production, conveying useful or necessary information about important human affairs, such as catastrophic sinfulness (e.g.

Sodomy). As biological anomalies they functioned also to further early modern scientific understandings of physiology and anatomy. “Thus,” write Daston and Park, “a child with four arms and legs, born on the day the Genoan and Venetian forces made peace, was at once the divine sign of brotherly reconciliation and the result of a narrow womb” (189). The biotextual meaning of monsters are both biologically situated, but also made culturally meaningful in ways unrelated to their biological constructions. Fitting to the occupational psychosis of experimentalism, however, is that such theological portents eventually made way for a much more rigorously instrumentalized understanding of monstrosities: “[b]y the early eighteenth century, however, the anatomical study of monsters increasingly drew its justification from the knowledge it could provide, by contrast, about the function of the normal organism, rather than from the wonder to be gleaned by examining singular cases in great detail” (204). Monsters have had and continue to play a significant role in the way information is conveyed in scientific and non-scientific cultures because of their importance in marking boundaries between the normal and the abnormal, the insane, the violent, or the diseased. Biomedical advocates make monsters of animal liberationists critical of experimentation, constructing them as biotextual instruments in the perpetuation of progressive biomedical knowledge.

One reaction to such monster-making in biomedicine is to reconceptualize it in a more formal way that captures the symbolic and rhetorical acts that that underpin an important method of biomedical communication. I propose “*teratopoiesis*,” from the Greek *terato-*, monster, and *poiesis*, to make. *Poiesis* is the etymological root of poetry, which here serves to remind us of monsters' literary meanings with interpretive implications. *Teratopoiesis* is a means to confront the monstrous in biomedical research and advocacy. As Hill explicates, Heidegger's conception of *poiesis* as a means to confront destructive technology aligns with Burke's own conception of

the symbolic change necessary to confront the destructive technology that comes out of experimental psychoses (16). Heidegger argued that the essence of technology was shared by that of art: to reveal and to make meaning. The duality of *techne*, technology and art, belongs to *poiesis*, that which is poetic, and brings forth (15). While modern technology had revealed a threatening relationship between humanity and nature in terms of use-value, and as biomedicine does of nonhuman animals, “*poiesis* offered imperiled humanity a means to counter technology, first aesthetically, but later technologically as humanity socially reinvents itself” (16). “In Heidegger's terminology,” explains Hill, “humanity will no longer grant technology the power to enframe inventiveness in a threatening manner, and in Burke's terminology, humanity will create a less dangerous orientation to technology through symbolic change” (16). *Teratopoiesis*, then, defines the making of monsters as technologies that reveal relationships we have to experimental beings and to ourselves, both technologically and symbolically; *teratopoiesis* invites and reminds us to reconsider how we engage with—linguistically and otherwise—experimental beings and with others made monstrous, and this is a symbolic corrective to the *entelechial* production of transgenic rodents, and to the way monsters are made out of the critics of biomedical experimentation. Monster making understood as *teratopoiesis* is a symbolic, interpretive, and poetic means to confront an occupational imposition of the monster metaphor in biomedical knowledge production and communication by certain biomedical researchers.

In the next section I turn to those researchers who argue that nonhuman animals do not make good models for predicting human disease and that animal experimentation for this reason, and this reason alone, ought to cease. I will draw rhetorical similarities between this discourse and the one just discussed in order to demonstrate how both perpetuate a narrative of progress in their discussion of animal experimentation via the psychosis of instrumentalization.

2.3 The Incapacitated Defense of Animals

In this section, I interpret how biomedical researchers and advocates who contest the methodological efficacy of animal experimentation for knowledge production exhibit a trained incapacity. This is manifest in the way in which they put biomedical efficacy ahead of other concerns around nonhuman interests, despite having sympathy for animal ethics. In this discourse, the liberation of experimental animals rests solely on whether or not they do what they are experimentally supposed to do. The biomedical orientation of these researchers means that their objections to the use of animals in research are framed primarily within a biomedical perspective. The salvation of animals from the realm of biomedical experimentation comes only from biomedicine if it can determine they are no longer of any use. And despite abundant accessible discourse on animal ethics, rights, and liberation, the trained incapacity prohibits these researchers from, in some cases, even entertaining the possibility of a solution outside of traditional biomedical consideration.

Researchers in this discourse contest the predictive value of nonhuman animal models for human disease and pharmaceutical preclinical trials—Greek and Greek lambaste such experiments as “misleading, unnecessary, dangerous, or all three,” (*Sacred Cows* 17). They argue that biological differences between species are too great for the kind of intraspecies extrapolation upon which biomedicine relies to understand disease and drug mechanisms and to predict outcomes in humans (Greek and Greek *Sacred Cows*, *Specious Science*, “Is the use of sentient animals in basic research justifiable?”; LaFollette and Shanks; Greek and Shanks; Pound et al). This discourse is published in journals such as *The Medical Journal of American Sciences*; *Medical Ethics*; *Philosophy, Ethics, and Humanities in Medicine*; *International Journal of*

Clinical Medicine; Science and Engineering Ethics; Medicolegal and Bioethics; Nature Medicine; American Scientist; Progress in Biophysics and Molecular Biology; Journal of the American Medical Association Neurology; British Medical Journal among others. Hugh LaFollette and Niall Shanks contend that “[a] careful scientific and methodological assessment of the practice [of using nonhuman animals as models for human disease] reveals that claims about the enormous benefits of animal research—claims made in both public policy statements designed for public consumption and in scientific texts—are exaggerated” (viii). In their meta-analysis of 25 systematic reviews of animal experiences, Pound et al. found that there were significant methodological issues, such as disparate species use leading to variation in efficacy and toxicity, varying similarity to human functioning between species, and variations in drug dosing schedules of uncertain human relevance, among others.

Although Greek and Greek pugnaciously criticize nonhuman experimentation, they nevertheless subscribe to a narrative of progress underpinned by a strong version of scientific realism. “The goal of science is to discover the truth” (*Specious Science* 16) they declare. They cite Kuhn to argue that “[s]cientific progress is contingent upon the expansion of new ideas and the replacement of old ones... science advances as scientists replace outmoded theories with improved theories that better explain the world” (18). Greek and Greek write of animal experimentation that “the failure of animal-model research has actually harmed humans and delayed medical progress in internal medicine, the development of medications, surgery, pediatrics, and diseases of the brain” (42). However, they assert that “scientific knowledge is always growing and improving as outdated theories are replaced with new ideas” (42), which is how they are able to both criticize a trope of biomedical research and to maintain the narrative of progress. Greek and Greek manage to maintain progressive interpretations despite their argument

that biomedicine relies on an inefficacious system of modeling. As they explain, “once we actually looked up the true origins of the advance in the scientific literature, we either found a clinical discovery, serendipity, or some other non-animal based discovery had previously revealed the knowledge, which animal experimenters later ‘validated’ in animals” (*Sacred Cows* 19). The narrative of progress, capable of withstanding the dismissal of the trope of nonhuman animal experimentation, finds itself sustained in doctor-patient relationships and observations, fortuitous discovery, or other forces that “reveal knowledge”; biomedical knowledge *has* progressed, just through agencies formerly misunderstood.

In communicating the narrative of biomedical progress, authors in this discourse are careful to distance themselves from animal liberation, which complicates the progress narrative. They write that, “[w]e do not use any ‘animal-rights’ arguments... this is a book of science and reason. Instead, we rely on the scientific facts and we rely on the voices of scientists who have personally experienced the ineptitude of the animal model, and who have come forward even when so doing may have jeopardized their livelihood” (*Sacred Cows* 20). Greek and Greek reinforce the authority of scientists, scientists whose testimony is on par with “scientific facts.” At the same time, they reify the clean boundaries between science and value-laden, emotional “animal rights,” as though those who advocate for animals cannot do so within scientific or reasonable frameworks, which might, as a borderland politic, complicate a narrative of biomedical progress. While Greek and Greek explicitly avoid questions of animal liberation and ethics, LaFollette and Shanks offer space to animal ethics amongst their scientific criticisms. They dedicate a section of the book to utilitarian and deontological understandings of consideration for the interests of nonhuman beings. As philosophers, their occupational psychosis less purely reflects that of biomedicine, though training in biological sciences

contributes to it. But as champions of scientific knowledge production, they preface such moral consideration with the primacy of scientific understandings: “[w]e must delve deeper to determine the scientific and methodological merits of animal experimentation. Only after we have done so will we be able to morally evaluate the practice” (18). They also “conclude that the practice of using animals in medical research is morally questionable, partly because we cannot straightforwardly apply findings in animals to humans. However, as we noted earlier, the evaluation of basic research, will, by its nature, be somewhat different” (x). While the authors acknowledge the moral issues of experimenting on nonhumans, the fruitfulness of moral-philosophical inquiry is predicated on first achieving a proper understanding of the scientific merits of such research. Like Greek and Greek, LaFollette and Shanks advocate for a scientific authority over a perspective from animal liberationists—the critiques of those in defense of animals must take a backseat while scientists first determine whether their methodology properly functions. Similarly, Pound et al. recommend that “[i]deally, new animal studies should not be conducted until the best use has been made of existing animal studies and until their validity and generalisability to clinical medicine has been assessed” (517). The serious consideration of animals ethics is largely rejected in this discourse so that the “scientific facts” of experimentation can be adequately addressed.

I argue that Greek, Greek, LaFollette, Shanks, and Pound et al. perpetuate the narrative of biomedical progress by instrumentalizing the very animals for which they seem to advocate. Brief acknowledgment of animal ethics notwithstanding, experimentalism relegates animals once more to the world of objects. As Singer writes, “animals have become, for the psychologist and for other animal experimenters, mere tools. A laboratory may consider the cost of these ‘tools,’ but a certain callousness toward them becomes apparent, not only in the experiments performed

but also in the wording of the reports” (50). Experimental animals' saving grace for these biomedical researchers is not that they have any worth, but that they are in fact worthless—as biomedical methodology they fail to produce the knowledge needed for progress. A defense of animals, then, comes to rest entirely on how they function as tools for us. But this psychosis leaves open the question of what to do with those animals who *could* be used as effective tools in our pursuit of knowledge or any other human enterprise. This is no defense of animals, but rather a defense of the instrumentalization of animals.

The emergent motive in this discourse is to persuade audiences that, like the animals themselves, animal liberation is either irrelevant or destructive to biomedical progress. In the previous section we see animal liberation constructed as a monstrous, repugnant opponent of biomedical progress. In this discourse, the rejection of animal liberation is less extreme. These authors state a sympathy for animal ethics while at the same time rejecting its appropriateness in biomedical research; Greek and Greek, for example, write that “we certainly have strong opinions on the philosophical and ethical debate regarding animal rights [but] we concern ourselves exclusively with science” (*Specious Science* 11). Animal ethics is still rejected, and that it is rejected by biomedical researchers sympathetic to this borderland politic speaks, I think, to the power of the trained incapacities at work. The imposition of a tool metaphor continues to be imposed even when the beings so instrumentalized are sought to be defended. And while there *teratopoiesis* is not a feature in *this* discourse, perhaps because of the explicit rejection of animal experimentation, Greek and Greek do attack *ethos*: “[t]he vagaries of human nature that keep animal-model research a thriving enterprise are the same ones that have hurt people since the dawn of time: apathy, ignorance, greed, ego, and fear” (*Specious Science* 27). Even without *teratopoiesis*, the discourse of biomedical researchers who contest animal model efficacy

continues to instrumentalize nonhumans as a function of its trained incapacity of biomedicalism, thus maintaining the progress narrative by rejecting a monstrous borderland politic just as it does the use of apparent monsters in biomedical research.

2.4 Conclusion

In this chapter, I have demonstrated how a reading of two biomedical discourses in fundamental disagreement on the efficacy of animal experimentation each continue to perpetuate and maintain the narrative of biomedical progress in their instrumentalization of animal liberationists and nonhuman models. Their shared biomedical psychosis explains this fundamental agreement. Those who continue to advocate experimentation impose a monster metaphor onto critics rather than engaging seriously with the ethical argument; the biomedical researchers who reject experimentation on grounds that it has no predictive value reveal their trained incapacity by confining nonhumans to the world of (ineffectual) objects in order to reject their use.

These discourses are united by their motive to persuade audiences to dismiss animal liberation as a question for biomedical research. In *Why Animal Experimentation Matters*, animal liberation, defined as a borderland politic, is seen as a monstrous ideology jeopardizing the lives of our children. It is something to be reviled, in complete antithesis to the humanist project of furthering biomedical knowledge. Greek and Greek, LaFollette, Shanks, and Pound et al. similarly dissuade audiences from considering animal ethics as playing any serious or fruitful role in biomedical inquiry. It is, at best, an afterthought. In other cases, as with Greek and Greek, it has no place—it is neither scientific nor reasonable. In each discourse, then, audiences are persuaded to consider animal liberation as either irrelevant or antithetical to biomedical

knowledge production—the narrative of progress has no patience for *seriously* considering nonhuman interests. I believe it is a serious problem for animal ethics in biomedicine—even for ethics in science more generally—if researchers consider legitimate moral consideration of experimental beings as monstrous or irrelevant. And I do mean *moral*—not only ethics committees that decide on the type of experimentation to be done on what volume of which species. The “3Rs” of animal experimentation—reduce, replace, and refine—operate inside the framework of the progress narrative that seeks the use of nonhumans to produce knowledge as instruments. Monstrosities and incapacities in biomedical research advocacy and criticism nullifies the serious consideration of nonhuman interests to further communicate the narrative of progress upheld by boundaries.

Chapter 3: Experimental Entertainment

In this chapter my purpose is to demonstrate how popularizers of biomedical research perpetuate and normalize the narrative of biomedical progress and its trope of animal experimentation for non-expert audiences. I do so by rhetorically analyzing three popular biomedical entertainment artifacts, consisting of books and public presentations. These artifacts perpetuate and normalize the progress narrative in several interconnected ways: in their *entelechial* optimism about biomedical advancement supported by occupational psychosis; by reinforcing the perception of bio-psychiatric likeness, especially emotional, between humans and nonhumans, thus reconfirming modeling efficacy; in the normalization and naturalization of biomedical experimental techniques, intervention, and interference; and the surface-level appeasement and dismissal of ethical concerns about the use of nonhuman animals for biomedical research. These artifacts seek to persuade their audiences, I argue, that biomedical experimentation on animals for knowledge production is entertainment, and, conversely, that industries of animal entertainment, such as zoos, aquaria, and pet producers are viable sources of biomedical data and communication. My rhetorical analysis offers an opportunity to consider the relationship between biomedical research and animal entertainment, a relationship I call the “technocircus/medizoo.”

3.1 Definitions, Artifacts, and Methods

In this section I define what I mean by “popular biomedical entertainment,” and offer an overview of my artifacts of this genre in light of their unifying occupational psychosis.

By “popular biomedical entertainment” I am referring to a genre. Carolyn K. Miller explains that genre, in Burkean terms, “refers to a conventional category of discourse based in large-scale typification of rhetorical action; as action, it acquires meaning from situation and from the social context in which that situation arose” (163). Genre is a classification of a given discourse with uniting characteristics or features that accomplish purpose, motive, or meaning relative to the context in which it operates. Genre has rules that “form a normative whole” (164), meaning that through the generic conventions (which are persuasive actions), audiences are persuaded of some situational morality. Popular biomedical entertainment is a genre that blends features of biomedical discourse with entertainment for non-expert audiences. Some features of biomedical discourse have been focused on and interpreted already in this thesis: animal experimentation, inanimation, *teratopoiesis*, instrumentalization, *entelechy*, occupational psychosis, and trained incapacity. Entertainment, too, requires explication. Peter Vorderer explains that “entertainment through media is a form of playing, i.e., a form of coping with reality... most often characterized by different forms of pleasure but—in certain situations—also by unpleasant aspects. It is an intrinsically motivated *action* that usually leads to a temporary change in perceived reality and that is repeated quite often by people who are, during this process, less intellectually vivid and attentive than they could be” (256, emphasis added). This play with reality is normative and affective, often featuring characters in need of moral evaluation (Bates and Ferri). Importantly, especially for Miller, entertainment is to be considered communicative action: a suasive element intimately connected to normativity and affect whose situation might be fantastical, experiential, or informational (Vorderer; Bates and Ferri; Steinmetz and Viehoff). Thus, I propose considering “popular biomedical entertainment” as a genre of books and presentations that attempts to persuade non-expert audiences to cope with

biomedicine's use of nonhumans and its imposition of instrument metaphor by means of normative and affective elements both pleasurable and informational that inhibit rather than stimulate a critical reflection of the progress narrative. This genre often refers to or makes use of animal entertainment industries such as zoos or pet manufacturing (though these are, of course, not genres themselves).

The rhetorical analysis I use in this chapter makes use of my second chapter's method in the context of popular biomedical entertainment. In addition to examining how this genre functions to perpetuate and normalize the progress narrative and its techniques, I will also apply occupational psychosis to these artifacts to demonstrate their orientation to biomedicine. I analyze three artifacts that are united under this generic definition. It is important to remark about these artifacts that while they themselves are entertainment, in their writing they also rely on other forms of animal entertainment industries, such as zoos, aquaria, and pet commodification and ownership, in order to support their claims. Over the course of this chapter I hope to shed light on this complex relationship between (animal) entertainment and biomedicine. First, in *Animal Madness: How Anxious Dogs, Compulsive Parrots, and Elephants in Recovery Help Us Understand Ourselves*, Laurel Braitman, an MIT PhD in History of Science, weaves a personal narrative about her deceased dog, Oliver, apparently afflicted with mental illnesses, to begin an historical and contemporary inquiry into nonhuman mental illness observed in captivity, and what their mental illnesses tell us about our own. Second, in *Frankenstein's Cat: Cuddling Up to Biotech's Brave New Beasts*, Emily Anthes, a journalist with a Master's in science writing from MIT, optimistically showcases new and supposedly imminent, living biotechnological commodities and tools, developed largely from biomedical experimentation, produced to satisfy a diverse range of human pursuits in biomedicine, warfare,

industrial animal agriculture, industrial pet production, entertainment, ecology, and even, purportedly, animal welfare. Third, in the TED⁸ talk “The Cockroach Beatbox,” Greg Gage, a neuroscientist and entrepreneur, dissects a cockroach then connects its leg to a homemade mp3 conduit for the purposes of instructing his child audience to reconceptualize their brains in a presentation that generates laughter, screams, and looks of shock as the cockroach is beatboxed into electrical action. I chose these artifacts because they are united by a suasive motive to have their audiences cope with biomedical progress founded on experimentation by making such experimentation entertaining while portraying animal ethics as an impediment to biomedical research or the entertainment derived from it.

I now turn to how, seen together, these works of popular biomedical entertainment function to perpetuate and normalize features of the biomedical narrative of progress that thus far in this thesis have been interpreted and criticized.

3.2 Occupational Psychosis in Popular Biomedical Entertainment

In this section I argue that authors of these artifacts instrumentalize nonhuman emotion in order to tell us something about ourselves, thus reinforcing the kind of likeness necessary to perpetuate the progress narrative. In doing so, these authors encourage their audiences to cope with experimentation and metaphor used in the progress narrative via entertaining means while revealing an occupational psychosis that imposes an instrument metaphor on both nonhuman experimental objects and human body parts. Audiences are invited to avoid the serious consideration of animal ethics in biomedical research by being redirected to the pleasurable, entertaining gains made by such research in other industries. I also interpret how the

⁸ It is worth noting that TED stands for “Technology, Entertainment, and Design.”

occupational psychosis of popular science entertainment perpetuates the instrumentalization of nonhumans necessary for the narrative of biomedical progress. This instrumentalization plays a key role in how these artifacts engage with animal ethics in the research and industries they feature, and here I argue that, as in chapter two, animal ethics is dismissed from playing any useful role in biomedical research.

In *Frankenstein's Cat*, Anthes encourages readers to cope with invasive biomedical experiments on animals by optimistically informing her audience of the entertaining uses to which animals affected by such experiments can be put. Novel pet production is supported by experiments that likewise support the progress narrative. Of biomedical progress with transgenic animals, Anthes writes, “[i]f the researchers put the gene [for a human antibody] in just the right place, under the control of just the right molecular switch, maybe they could engineer animals that produced healing human proteins in their milk. The doctors could collect medicine by the bucketful” (35). By streamlining the way we make tools out of animals, biomedical research can progress its pharmaceutical production to previously unimagined quantities. Anthes's occupational psychosis is forcefully revealed when she explains of this process that “[s]cience has given us a whole new toolbox for tinkering with life” (4) and that “[m]uch to the chagrin of the animal rights crowd, biotechnology lets us turn animals into even better tools” (42). She declares with optimism that “[o]ur grandest science fiction fantasies are becoming reality” (7), as she considers the ways molecular biology, genetics, animal science, and electronics and computing can “target one specific gene, to instantly turn it on or off, to silence or amplify its effects” (6) or to “hijack a rat's brain and guide the rodent, like a remote-controlled toy” (7). The psychosis of biomedicine, then, engenders an *entelechi* outlook of progress supported by the construction and transformation of nonhuman animals into instruments, but that importantly this

instrumentalization needn't be limited to biomedical research tucked away from a public, but rather expanded to fulfill desires to have animals entertain us. The audience is asked to “[i]magine a future in which we can each pick out the perfect animal from a catalogue of endless options... for the twelve year old who has everything, skip the toy cars and planes at Christmas and wrap up a remote-controlled rodent” (9). Importantly, gains spurred by biotechnological breakthroughs initially developed for biomedical or military purposes eventually enter the marketplace, where the commodification of nonhumans can, according to some, be fully realized in industrial pet manufacturing. Just as biomedical researchers consider rodents “quiet, clean, easily trained pets” (Harkness and Wagner 67), Anthes reinforces a psychotic instrumentalization of nonhumans founded on the promotion of novel pet-toy ownership.

Many of the modifications made to animal bodies to further biomedical knowledge are marketable to non-scientific consumers. Anthes excitedly describes the various uses to which genetic engineering can be put: *glofish*, with names like Electric Green, Sunburst Orange, Cosmic Blue, and Galactic Purple that reinforce the hegemonic nomenclature of science by recalling cosmology, astronomy, and physics; rats that can be remote-controlled, an apex of human domination over nonhuman behavior; and potentially being “able to come up with an animal that loves only you” (22), playing god⁹ with the emotions of pet animals. And for Anthes, such commodification is obvious: “[w]hether it's a puppy or a pair of heels, we're constantly searching for the next big thing” (18). Audiences are persuaded to accept the narrative of biomedical progress not only when Anthes details the kind of instrumentalization of animals for a range of entertaining purposes made possible by invasive biomedical experimentation. Audiences cope with otherwise controlling, invasive manipulation of animal life by being asked

⁹ Indeed, reminiscent of the commandment against the worship of other gods.

to imagine the play and pleasure they can derive from such developments in biotechnology. We might not be able to control the inevitability of realizing even the strangest science fiction as biomedical research continues its *entelechi*al path of instrumentalizing nonhumans for knowledge production. But we can, at least, remote-control pet rats to sate our appetite for new commodities to entertain us—and in a way that inhibits our asking questions we might otherwise have of the narrative.

Anthes discounts the problems of technological manipulation of animal life—confinement, pain, fear, confusion, and trauma—by focusing on what *could* happen in the future if entertaining biotechnology based on biomedical research continues. After conceding that “our own needs and wants [don't] necessarily put animal welfare first” (8), Anthes addresses this concern by claiming that “[i]f there is peril here [with further modifying nonhumans], there is also great promise” (9). This great promise turns out to be such benevolent technological innovation as reviving species we have extinguished, alleviating the suffering of certain dog breeds we breed to express debilitating phenotypes, and potentially altering the physical and mental abilities of other nonhumans. The natural abilities of animals are considered a deficiency that biomedical and biotechnological advancement could improve: as though something were wrong with how apes' brains currently work, we can use new technologies to “augment” ape consciousness (9). When all nonhumans are a potential tool, it is rational from the perspective of occupational experimentalism to refine them, and even more so as we come to see our *own* brains as mechanized parts, such as Gage does. This argument reaches its peak when Anthes asserts, “there are instances in which engineering (or reengineering) animals is a moral imperative” (176). Technology is rhetorically constructed here not as a problem, but as the solution we *must* develop. She brushes aside moral concerns over such new technology by

arguing that “using animals for our purposes isn't new. Should we object because the technology is?” (37). It is as though *new technology* could pose no unique moral challenges—odd, given that the technology of animal modification has changed so drastically that an entire book can be written on the subject. New technology does pose unique challenges often because its *entelechi*al pursuit to perfection enables us to do new things in the world, things we have previously not been able to do, such as annihilate hundreds of thousands of people with one bomb. Progress is affirmed in the relationship between entertainment and biomedical research as an inevitable, necessary good, despite acknowledged past harm caused by technology.

In “The Cockroach Beatbox,” Gage expresses the occupational instrument metaphor both by describing our own organs¹⁰ and by the transmogrification of an animal in a stage performance. Gage begins by explaining to the audience that if he were to ask how the heart works, “you would instantly tell me it's a pump” (0:21) but that asking how the brain works does not (yet) elicit such easily understood mechanistic metaphors¹¹. Part of Gage's purpose is to generate an instrument metaphor that can further the understanding of human neurophysiology and through this understanding “begin the neuro-revolution” (5:57). Gage informs the audience that he uses cockroaches because their brains are similar to ours, but it is not the cockroach's *brain* that he uses in his demonstration. Rather, Gage severs one of the cockroach's legs and hooks it up to his “spikerbox,” his invention that “replaces lots of expensive equipment in a research lab, so you guys can do this in your own high schools” (2:41). The leg of a cockroach thus models the brain of a cockroach that models the brain of a human. Because the action happens quickly, paired with attention-grabbing animation, no room is given—or, perhaps, needs to be given—to explain to the audience how or why such layered modeling is appropriate. The

¹⁰ It is also worth noting the etymological root of *organ*, which is from the ancient Greek for tool.

¹¹ See Brain and Wise for an historically situated analysis of mechanistic metaphor and body parts.

moment appears to be real time blackboxing—the cockroach blackbox: focus on the inputs and outputs of this efficient scientific technology that obscures its internal complexities (Latour *Pandora's Hope*). Gage is thus able to reify the mechanical metaphor for the human brain, since electric inputs configured through the spikerbox cause the *model* of the human brain, the cockroach leg, to move. Our hearts are pumps, and our brains can likewise be configured mechanistically so that an instrument metaphor can be consistently expanded across all human body parts for the sake of “revolutionary” neuroscientific knowledge production. The child audience is persuaded to cope with this metaphor by way of the entertaining uses a cockroach leg—the model for our brain predicated on a new mechanistic understanding—can be put.

In the demonstration, Gage normalizes biomedicine's experimental techniques¹² by jocularly dismembering an animal onstage in front of an audience that seems to be aged ten to fifteen. He renders his demonstration engaging by employing jokes, animation, and music. When Gage tells the audience that he is about to do “a scientific experiment to understand the [human] brain” (1:38), he removes the live cockroach from its ice bath (to, in his words, “anesthetize” it) and cuts off its leg (2:30). Here, the young audience is being persuaded that it is all right to dismember an animal to understand the human body. They are persuaded, too, that this process can be pleurably affective: when the camera pans to the audience to capture reactions to the demonstration, at least some of them find it funny or pleurably shocking—understandably, given Gage's jocular stage presence. Contributing to this playfulness is his use of a beatboxer to provide the electrical inputs needed for the cockroach's leg to twitch as the demonstration continues. He could have used a saxophonist, or an accordionist—but the

¹² While Gage's demonstration is more broadly for neuroscience, I take this to be an example of popular biomedical entertainment because neuroscience is an important component of biomedicine, and because animal experimentation (as used in Gage's demonstration) is an important component of biomedicine.

demographic would suggest that a more persuasive device would be a contemporary, “cool” musical art. As one commenter, “승현 이,” in the comments section of the talk on TED's website candidly writes, “[a]ctually, I didn't want to watch this video because I really hate cockroaches. [T]hey look really nasty, I hate everything that has 6 legs. But I watched this video because the word ‘beatbox’ got me” (*TED*). Not only is the use of the beatbox a clever act of persuasion, but so is the choice to use a cockroach. There are similarities here between what has happened on this stage with Gage, and what I interpreted the terministic screens of *rodent*, *rat*, and *mouse* doing for biomedical experimentation in chapter one. Both rely on creatures feared and loathed—on monsters, even—and this conveniently sidesteps complicating questions about using live animals in research, or entertaining education. As with Anthes's book, a video such as Gage's offers an opportunity to discern an important motive in the use of nonhumans in this way: to persuade audiences that science in general, but here neuroscience and biomedicine in particular, can transform grotesque, unwanted beings, with whom we begrudgingly interact, into “cool,” useful, or interesting instruments for knowledge or for play. Rodents become tools for cancer research, and cockroaches become beatboxes for the “neuro-revolution.” And one way the child audience is persuaded to cope with a progress narrative that has their own brains reduced into nothing more than an occupationally rendered circuit board metaphor on par with a dismembered cockroach leg, is to have them observe what fun it can be to involve one's demographic musical tastes in the instrumentalization of a feared and loathed animal by cutting off its appendage.

Gage attempts to persuade his child audience that any consideration of animal ethics in biomedical research can be reduced to little more than a few second's glib and entertaining treatment of a disposable, repulsive animal. Working with a live cockroach on stage, he attends

to whatever concern there might be for a culturally loathed and feared insect by dropping it into an ice bath¹³. He explains that “we need to take off the leg of a cockroach [but] don't worry, they'll grow back” (2:12) and “they're not going to be able to feel anything [because of the ice]” (1:19). These two moments constitute the entire extent of moral engagement for the six-minute presentation. The suasive message here is that not only can animal ethics in science education be addressed in *seconds* when one wants to use animals in scientific experiments, but that the solutions to it are simple: use creatures who can regrow amputated limbs and just add ice (or some other anesthetic). Gage does not even advise the child audience against trying such experimentation at home, as one might expect from dangerous demonstrations¹⁴, since the very point of the demonstration is to encourage children to do this, in part, at home. In fact, on his website “Backyard Brains” one can purchase the “RoboRoach,” a small piece of invasive hardware that can be attached to a cockroach in order to control its movements, similar to the remote-control rat an excited Anthes writes about (*Backyardbrains*). Such an invention is another example of *entelechi*al pursuit that seeks to follow through with the totalizing technological control over animals. Children seem to be encouraged to capture animals, cut their legs off, and attach them to neuroscientific equipment in order to understand their mechanized brains for the sake of the neuro-revolution. Gage does not say to the children that they must, before experimenting, anesthetize as he does; in fact, I believe that Gage is merely performing rather than engaging the moral dimension. Part of what makes this performance palatable is Gage's use of a culturally feared and loathed animal. The loathing is so strong that he even

¹³ While some may consider my focus on an insect odd, especially in light of research done on vertebrates, I believe one can still see the example of Gage as an important one *because* it is not only cockroaches that are used in research. Gage in no way implies that only insects should be used in experiments. I argue he is priming his child audience to work with other animals.

¹⁴ Dangerous, of course, for whatever animal will be connected to the spikerbox.

vouches for the cockroaches: he calls them “our friend,” “cool,” (1:08) and says they have “beautiful hairs” (1:45). It does not take much to appease the moral concerns, if any, about the experimental use of a detested animal. Yet despite Gage's affinity for cockroaches in this experiment, he does not say that cockroaches *must* be used in this experiment—perhaps any small animal will do. Perhaps children will leave an entertaining presentation such as this excited to see if they can beatbox the leg of a mouse, robin, or frog. Perhaps they will even submerge them in ice first. A significant motive of popular biomedical entertainment is that animal ethics can be addressed easily and quickly in biomedical research and subsequent biotechnological inventions.

In *Animal Madness*, Braitman persuades her audience to cope with biomedical progress by way of an entertaining, affective personal narrative. This coping is supported also by detailing the ways nonhumans in a variety of contexts are drugged for supposed mental health purposes to make them more manageable in animal entertainment industries: pet industries and ownership, aquaria, and zoos. The death of her deeply troubled dog, Oliver, prompts her investigation into the history of interpretations of human mental illness by focusing on nonhuman animals. On this point, Braitman seems to be a scientific realist, relying at times on Darwin, and at other times on neuroscientists, psychiatrists, and animal biologists to support claims that nonhumans experience such illnesses as OCD, depression, and psychosis, in an effort to understand her deceased dog's behavior. The emotional experiences and brain structure of nonhumans, she writes, “are one set of reasons that nonhuman animals have been used for more than a century as neurophysiology research subjects in the quest to develop therapies for people” (31). This quest, however, has returned to its source: she informs us that in 2011, pharmaceuticals for pets reached almost USD 7 billion, including for psychotropics, and their generic counterparts, such as Prozac, Valium,

and Xanax (209). In research labs, Braitman writes that “[a]ntipsychotics, antidepressants, and antianxiety medications have, for example, been used to treat macaques and other primates used in research [who are] distressed beyond measure, biting themselves and feeling despondent” (197). Psychotropic drugs in zoos and aquaria are “commonly used” according to industry veterinarians (200). “Many marine mammal trainers and zookeepers have signed nondisclosure agreements with their employers,” Braitman explains, “[g]iving animals psychotropic drugs to treat signs of mental illness, even if it has become common practice among humans, may invite unwanted criticism of the industry” (199). This ubiquitous drugging of various nonhumans in sites of animal entertainment—and even drugging them for “mental illness” acquired in the very laboratories that use them in painful experiments—functions to persuade audiences of the efficacy of animal models, since pharmaceuticals can so effectively treat “mad” animals. And Braitman seems to advocate for troubling uses of such treatment, since “psychopharm for pets can be a useful way station on the road to recovery, or a stopgap measure on the way to the gas chamber” (215). Audiences cope with biomedical progress, underpinned by animal experimentation, by witnessing pharmaceutical use on deeply troubled animals in animal entertainment industries in which these audiences themselves participate. Biomedical intervention is made to seem pleasurable and playful by supporting such entertainment industries; these industries seem unable to functionally control their captive animals without psychotropic interference, for instance. Biomedicine also acquires lucrative access to nonhuman patients while at the same time reinforcing efficacy in the public's eye. Braitman's book thus is best understood as entertainment because it inhibits rather than stimulates a critical reflection on the progress narrative.

In *Animal Madness*, animal entertainment industries reinforce the biomedical narrative by supposedly demonstrating pharmaceutical efficacy in captive nonhumans by managing their troubling behaviors. This is how Braitman reveals a trained incapacity: biomedicine, founded on the confinement of nonhumans, is the solution to the problems animals experience in confinement in sites of animal entertainment. Biomedicine even becomes the solution to animals' experience of confinement in biomedical research facilities. While Braitman herself is not drugging these animals, but rather writing about their drugging, nevertheless her entertaining narrative of the overwhelming prevalence of nonhuman psychotropic drug consumption seeks to persuade audiences that the drugs *work* on nonhumans and that we ought to attend to animal mental illness this way. Braitman herself writes, “dosing of other creatures with psychopharmaceuticals also serves as a sort of tacit acknowledgment of emotional (and neurochemical) parallels between humans and other animals” (187). Such drugs work well enough to stop gorillas biting their fingers until they bleed, to stop cetaceans compulsively regurgitating, and to stop dogs from screaming from separation anxiety. Troubling though it might be to the public to know that some entertainment animals are taking high doses of antidepressants or antipsychotics, the idea that animals can functionally serve as models for human mental illness is reified in such examples. Knowing that pets can be and are put on the same psychotropic pharmaceuticals as their owners serves to perpetuate these tropes of the biomedical narrative—that animals work as an essential tool of biomedical research and testing because of their similarity to us. Though Braitman seems to express some concern over the amount of dosing in sites of animal entertainment, her book is, as the subtitle says, nonetheless about *How Anxious Dogs, Compulsive Parrots, and Elephants in Recovery Help Us Understand Ourselves*. Case studies of dosed orcas at SeaWorld function to help us understand ourselves,

and they do so because they can serve as efficacious models of human mental illness. What appears most problematic here is that these drugs seem to “work” by numbing animals to abuse and captivity. The human-animal comparison here reveals an insidious motive that in contexts of abuse, confinement, severe loneliness, boredom, or fear animals, including us, ought to turn to pharmaceuticals to cope. Deflecting these animals' context to one of madness serves only to persuade readers that something is wrong with these animals, like something is wrong with us, and biomedicine can fix us both and enable our “functioning” in contexts that are perhaps truly mad.

Braitman's history of science account of how human mental states have been extrapolated onto nonhumans does not problematize nor complicate the progress narrative. Instead, Braitman offers an historical account that reinforces a biomedical understanding of animal emotion and mental well-being by way of a trained incapacity. Foregone is the insight that at least one important reason for interpreting nonhuman mental health through the lens of human mental illness is that it provides the means to justify continued captivity for the sake of entertainment, research, and ownership by labeling the *animals* unwell or as problems—unwellness and problems that can be ameliorated by the very drugs that require their captivity in order to be tested in the first place. The suasive motive is that animal mental illness and behavior is the problem, not the way we treat them. This interpretation of animal behavior and madness finds parallels in human psychiatry, which can overlook oppressive social contexts in favor of biomedical interpretations of human behavior, attempting to make humans “function” in oppressive situations with biomedical treatments (Whitaker). As Braitman herself argues, “[w]hat is surprising about all of this is not that we are giving animals psychoactive compounds, it's that we are doing it to help them cope with *us*” (187). I suggest here that as an occupational

psychosis, biomedicalism, in addition to imposing monster metaphors interpreted in chapter two, also creates patients—in this case, captive animals—out of those who could be, instead, considered to be victims. And though Braitman comes close to the kind of understanding necessary in this moment, the title of the book, *Animal Madness*, illustrates the aforementioned motive; “madness” as a terministic screen deflects realities about animals being abused, confined, crowded, bored, lonely, and in some cases tortured.

This is an example of diagnostic expansion, a term Peter Conrad explains is a similar phenomenon in biomedical diagnostics, “how once a diagnosis is established, its definition, threshold, or boundaries can be expanded to include new or related problems or to incorporate additional populations beyond what were designated in the original diagnostic formulation” (47). Biomedical categories of mental illness are expanded to include nonhuman populations: for instance, Braitman suggests neurosurgery for OCD in dogs, where “the surgeon sings a corresponding bit of tissue” (32). This is distinct from merely *using* nonhumans as models, for one can use models without being committed to the claim that they exhibit the illness in question (e.g. toxicity testing). And yet, despite this expansion and biomedicalization of nonhuman emotion, neuroscientists need not even commit themselves to the complicating idea that nonhumans can *feel*. Braitman revealingly quotes a neuroscientist conducting experiments on fear in rats, “[i]t's not the rat part of the rat,’ he said, that makes it a good study animal. ‘It's their amygdalas. Because theirs are so similar to ours.’ ... Other animals may have feelings, he argues, but we will never know them, and that is not the goal of his research” (34). Even a neuroscientist conducting research on fear in relation to psychiatric categories like PTSD and anxiety disorders, and thus inducing fear in his research objects, does not have to admit that they feel fear. Such is the power of a rhetorical motive that seeks to expand the territory where biomedical knowledge

may progress while excluding complicating understandings that could otherwise problematize the use of experimental animals. More troubling still, is that when biomedical researchers *do* recognize other-than-human emotion it often is simply to bring animal emotion into the fold of experimentation (see Goossens et al.). Rather than having nonhuman emotions disrupt their use in experimental programs by perhaps evoking empathy or concern, their emotions become new avenues of expanded exploration in biomedical research.

Braitman portrays moral concern as outside or apart from science and scientists in her work of popular biomedical entertainment. Though her book is bloated with problematic human-nonhuman interactions, Braitman offers little by way of moral interpretation. In chapter two, she details Harry Harlow's infamous deprivation experiments on monkeys. While she calls him the “dark lord of monkey torture” (40), the word “torture” is drained of its force as she enumerates his experimental discoveries. “Harlow's experimental results,” writes Braitman, “eventually helped change what people thought it meant to provide for an infant. In a way it was Harlow's benighted, suffering monkeys who taught us that some things are more important than food and shelter” (42) as if we needed to torture monkeys in order to know that children need affection. The narrative of biomedical knowledge production—here of psychiatry and behavioral psychology—triumphs over problematic counter narratives, such as egregious animal abuse. Braitman does not even mention what Harlow called his “rape rack,” used to impregnate the monkeys (Singer *Animal Liberation*; Haraway *Primate Visions*). Haraway contests these biomedical meanings drawn from Harlow's experiments, instead focusing on the glaring tropes of motherhood employed to reify gendered norms in science research (*Primate Visions*). When Braitman does engage with moral criticism of the scientific use of nonhumans, it is to say the following: “[f]or most people, though, to selflessly love another creature is to be open to loving

other humans, who are animals as much as pandas, cows, or Shih Tzus. This is why I never trust an animal rights activist who is misogynistic or thinks that *Homo sapiens* are, at heart, more rotten than any other species. Human rights activists are animal rights activists by default. The reverse should also be true” (281). Interestingly, Burke thought humans *are* more rotten than any other species—that one defining aspect of man is that he is “rotten with perfection,” that *entelechy*, the human drive to take a goal to its ultimate end, progressively, ironically, perfects an activity regardless of whatever destructive consequences might result from achieved “perfection” (“Definition of Man”). But for Braitman, animal rights activists are constructed as morally compromised: they are depicted as susceptible to misogyny and unjustifiable misanthropism, untrustworthiness, and to fail in a duty to be human rights activists. It is unclear whom she means, as Braitman does not cite any animal activists. One wonders if Braitman distrusts all misogynists, or only those who advocate for nonhuman interests, given that she does not mention Harlow's sexual violence against monkeys and lauds his andro-normative research. These associations with woman- and human-hating echo sentiments observed in chapter two as researchers rhetorically construct opponents and their ideologies as monstrous. More troubling, however, is the assertion that human rights activists are by default animal rights activists. Anthropocentrism like this is precisely what reflects and enables apathy in the face of real nonhuman suffering. Such a rhetorical move seeks to persuade audiences that all that is needed for nonhumans to have their interests seriously considered in biomedical research is to seriously consider the interests of humans, the invalid inference being that because humans are animals, those who care about human animals therefore care about nonhuman animals. Braitman makes the dubious case that biomedical researchers, given that they work for a human right to health, must therefore be seen as respecting animals rights in their laboratories.

I this section I have interpreted how the narrative of biomedical progress is perpetuated by artifacts of popular biomedical entertainment. Audiences are persuaded to cope with novel, invasive biomedical experimentation in entertaining ways or in ways that support sites of animal entertainment. Entertainment inhibits the critical reflection of experimentation that supports the progress narrative. Authors of these artifacts reveal an occupational psychosis by imposing instrumentalizing metaphors on both nonhumans and humans in order to perpetuate the progress narrative. Anthes affirms the instrumentalization of nonhumans as commodities or increasingly efficient models because of biomedical or biotechnological developments that support both biomedical research and the animal entertainment industry of pet manufacturing by way of biotechnological manipulation; Gage instrumentalizes a dissected cockroach's leg in order to persuade his child audience to consider their own brains to be mechanistic devices, and that such reconceptualization will lead to the “neuro-revolution”; Braitman reinforces a biomedically necessary psychological-emotional likeness, supported by psychiatry and neuroscience, between humans and nonhumans uncovered in sites of animal entertainment, such as zoos and pet industries/ownership. The suasive motive that unites these works of popular biomedical entertainment treats the serious consideration of animal ethics as an easily handled impediment to biomedical research and animal entertainment industries and suggests that animal ethics *itself* is not entertaining. But the motive also reinforces the bio-psychiatric likeness across species necessary to narrative of biomedical progress by endorsing the biomedical use of and inference with nonhumans in industries of entertainment such as zoos, aquaria, and industrial pet manufacturing. An attempt is made to persuade audiences to cope with otherwise shocking new invasive biotechnological developments founded on biomedical research by taking part in the pleasure of entertainment supported by such biotechnology.

Additionally, those who take up biomedical research as a form of entertainment in books and presentations seek to persuade audiences that animal ethics plays little to no role in popular biomedical entertainment, and thus biomedical research more generally. It is a problem for the communication of biomedical research that those who popularize the use of animals in scientific experimentation have little or no moral proclivity as a function of their occupational psychosis. To quote Anthes's boastful attitude: "I have never—not once—stopped to consider the animal at the end of my chopsticks" (106). Since she has stopped to consider the animal in this sentence, it seems she is seeking to prove her apathy for animal ethics as she writes about biomedically-motivate technology for her audience. Gage spends mere seconds performing animal ethics on stage, while encouraging children to experiment on animals at home. "We could close our nation's zoos," Braitman suggests, and "stop leading the sorts of lives that cause large numbers of our pets to end up on psychopharmaceuticals [and w]e could stop eating mentally ill pigs, chickens, and cows...and quit testing our drugs, cosmetics, and medical procedures on lab animals housed alone and in terribly uncomfortable conditions" (283). Though we *could* do these things, we ought to instead, she argues, open interactive petting zoos that teach urbanites about animal husbandry and veterinary medicine. Entertaining conditions must be improved for our tools to function properly as food and knowledge producers. If non-expert audiences receive interpretations of nonhuman animal experimentation through the rhetoric of those uninterested or incapable of understanding and treating seriously the problem of animal ethics in science, then these audiences are being persuaded, as in chapter two, to see biomedical research as something that need not be bothered with issues in animal ethics. Animal ethics in biomedicine should not be an afterthought, just as ethics in science should not be an afterthought. Ethics must be integral to the enterprise in a serious way if we are to have hope that occupational psychoses that demand

the *entelechi*al progress of biomedical research will not succumb to destructive perfection involving animals. Researchers must truly ask themselves the hard questions in animal ethics, and look to how animals are spoken of, to grasp the implications of their work on nonhuman beings. It is not enough to put a cockroach on ice.

3.3 The technocircus/medizoo

In the interpretation of these artifacts, a relationship emerges between biomedical research and sites of entertainment that both rely on nonhumans for their functioning. I call this relationship the *technocircus/medizoo* (*tcnz*): it is an occupationally psychotic site of interaction where biomedical research both relies upon and contributes to industries of animal entertainment. As these artifacts have shown, biomedicine relies on animal entertainment for lucrative patients; for public displays of experimental efficacy; and to perpetuate and normalize its narrative to non-expert audiences through media, new animal commodities, and “functioning” exhibition animals. And biomedicine contributes to animal entertainment by medicalizing disruptive animal behavior; by creating animals that can then be marketed and sold as pets; and in developing psychopharmaceuticals that can control captive animals. The *tcnz* happens in zoos and households where nonhumans are drugged; it happens with domesticated mammals and fishes who are modified using techniques developed for biomedical research to add value to them as commodities for sale; and it happens when they are turned into musical instruments to teach children about the mechanized human brain.

I suggest that the pursuit of biomedical knowledge, and that of science knowledge more generally, that relies on nonhuman animals *is itself entertainment* for those who do it, not unlike pet ownership, zoo exhibits, or aquarium performances. Anthes writes that, “researchers hope to

create 100,000 strains of modified mice, each eccentric in its own way. It would be enough to fill a carnival sideshow thousands of times over. As long as we're dreaming up animal sideshows, we needn't stop with peculiar mice" (4). I argue that part of the motive to create novel strains of animals in biomedical research, to cut off an animal's leg on a stage in front of children learning about neuroscience, or to work with drugged orcas in a waterpark is because it is entertaining, and the pleasure derived from such entertainment seriously inhibits the critical interpretation of the use of these animals in these moments. In fact, the pleasure derived from such activities seems predicated on control, invasive manipulation, and pharmaceutically glossed abuse. The *tcnz* seeks to persuade audiences that animal entertainers are also human models, and vice versa—flexible tools that can both entertain and inform. This narrative of biomedical progress is a narrative that entertains, amuses, and amazes.

In this chapter, I have sought to demonstrate how popular biomedical entertainment functions to perpetuate and normalize the narrative of biomedical progress and its trope of animal experimentation. Such a genre persuades its non-expert audiences to cope with biomedical progress, which could otherwise be perceived as a shocking or unsavory reality, in pleasurable ways that inhibit critical reflections on the meaning of progress in such audiences. Occupational psychosis reveals itself most clearly in the perpetuated instrumentalization of nonhumans, and in the trained incapacities that consider biomedical and biotechnological developments as the solution to human harm done to animals. Furthermore, emotional-physiological likeness between humans and nonhumans is reinforced, and animal emotions, rather than complicating their use in biomedical research as feeling beings, are subjected to an expanded range of experimental techniques as their emotions become biomedical subject matter.

These artifacts normalize the techniques of experimentation, while moral concerns about such experimentation are dismissed.

Through the analysis of these artifacts and their rhetorical motives, an important relationship between biomedicine and animal entertainment emerges that I call the *technocircus/medizoo*. Genetic-biomedical techniques such as gene switching are versatile enough to contribute to biomedical knowledge production, and also to industrial pet manufacturing; zoos can feature both as site of patients and data in a lucrative biomedicine industry, and also as advertisements for the efficacy of experimental techniques to public audiences. Biomedical research both contributes to and benefits from animal entertainment: biomedical understandings of mental health imposed on nonhumans help to problematize animal behavior rather than animal industries, create profitable commodities through bioengineering for various animal industries, while psychopharmaceuticals offer methods of control over captive animals forced to perform or be alone. Popular science books and presentations perpetuate and normalize biomedical narratives, while animal entertainment industries provide sources of patients, experimental data and subjects, and model efficacy reification in the public's eye. This partnership, convenient both for biomedicine and animal entertainment, is at the expense of animals whose interests are dismissed—animals who become the flexible instruments of both knowledge and entertainment production in an occupational pursuit of data and pleasure.

Conclusion

I have demonstrated in these chapters that the rhetoric of biomedical researchers, advocates, and popularizers writing and speaking about research animals fundamentally inhibits the serious consideration of animal interests for the sake of perpetuating a narrative of biomedical progress and knowledge production. I have done so using Burke's pentad and understanding of terministic screens, occupational psychosis, and trained incapacity by interpreting the language of biomedical discourse as seeking to persuade audiences of progress, and to consider experimental animals as mere instruments integral to this path to progress.

In chapter one, "Terminal Distance," I argued that the rhetorical construction of mice as scene and researchers as agency in a foundational, transgenic biomedical report by Stewart, Pattengale, and Leder enabled a distance necessary to conduct such experimentation in the first place. This was achieved by inanimating mice as the *scene* and researchers as the *agency* of biomedically active data, much as the rhetoric of the Tuskegee Syphilis Project functioned for the black subjects in this study. The terms that both biomedicine and Anglo culture at large affix to rodents, including the very word "rodent," reflects and deflects use-oriented, feared, or loathsome realities about these animals that makes their use in violent biomedical experiments more palatable. Biomedical research seems to take advantage of deep cultural fear and loathing of these experimental animals, who make up most of biomedical research, in order to avoid outrage against the use of animals in experiments.

In chapter two, "Monstrosities and Incapacities," I argued that serious animal ethics is rejected by two groups of biomedical researchers who stand on opposite sides of the question as to whether animal experimentation produces knowledge. Paul and Paul, Nicoll and Russell, and

Morrison, advocating for experimentation, instrumentalize critics of biomedical research by imposing a monster metaphor onto them in keeping with their occupational psychosis. Greek and Greek, LaFollette and Shanks, and Pound et al., rejecting experimentation, nonetheless reinforce the instrumentalization of nonhumans by suggesting the only or primary way to evaluate animal experimentation is through the biomedical lens—that is, to determine whether animals are efficacious instruments or not—in keeping with their training as biomedical researchers. This training incapacitates them in making any serious consideration of animal ethics. Both critics and animals are instrumentalized in order to maintain the progress narrative, serious animal ethics becoming merely an absurd or irrelevant point of contrast to normative knowledge production.

Finally, in chapter three, “Experimental Entertainment,” I argued that the genre of popular biomedical entertainment persuades audiences to cope with the progress narrative and its increasingly invasive experimental techniques on animals by considering biomedical research as entertainment and as important source of entertainment. I named the relationship between biomedical research and animal entertainment the *technocircus/medizoo*: a site of occupational psychosis where biomedicine both supports and is supported by animal entertainment industries. Biomedicine is given lucrative patients, and offered public displays of drug and experimental efficacy in animal models and the potential of novel pets by animal entertainment industries. In turn, these industries are benefited by biomedicine because it medicalizes and controls problem captive animal behavior and creates new techniques that can be applied to the marketplace of pet production.

Language is action, and we can act against animals by describing them as places or vessels for our entertainment and knowledge. And we can act for animals by pointing out and contesting troubling language that suggests they are mere instruments, or that those critical of

their use are in some way monstrous or unimportant. If we want our language to reflect action that seriously considers the interests of animals—if mice are not to be considered mere places of biomedical data and if their loathing is not taken advantage of to pre-empt concern—then the stakes for the narrative of biomedical progress is the end of experimental animals to fill in gaps to progress knowledge. The stakes for animal entertainment seem high as well: the end to medicalized and controlled captive animal behavior, and to the technological and genetic means to produce novel pets. But progress has many iterations, and narration can come from different voices, such as those who reimagine what progress can mean when framed with different terms. The narrative of biomedical progress could include a moral progress storyline that expresses empathy and concern for those other-than-human, even for rodents and cockroaches, and a rejection of their construction as a *place* of biomedical action. Progress could mean the inclusion of critics as on-par moral players who can fruitfully comment on and engage with biomedical researchers about how animals can participate differently in non-harmful, non-lethal ways, or not at all as other methodologies are conceived of and developed further. Progress could also mean that the serious consideration of animal ethics in biomedicine becomes entertaining and that biomedical entertainment seriously considers animal interests. The narrative of biomedical progress is unfinished, and it remains to be seen what new considerations narrators could include if animal interests are taken seriously in biomedical research.

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