

ZOOLOGICAL MODERNISM: LITERATURE, SCIENCE, AND ANIMALS IN EARLY
TWENTIETH-CENTURY BRITAIN

By

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INTRODUCTION

WRITING ANIMALS IN MODERN BRITAIN

Aldous Huxley's 1928 novel *Point Counter Point* opens a window into the world of 1920s British intellectual culture, a world in which modern science and modernist literature evolve together in surprising ways. For one of Huxley's characters, the writer Philip Quarles, zoology becomes the hinge of his literary experimentation. Quarles records in his writing journal, "Since reading Alverdes and Wheeler I have quite decided that my novelist must be an amateur zoologist. Or, better still, a professional zoologist who is writing a novel in his spare time."¹ What does it mean for the novelist to be a zoologist? For Quarles, it means applying the scientific gaze to people, recognizing what is termite-like or duck-like in us. But there are other possible answers. As this dissertation shows, some modernist writers explored the question of what it would mean to write as a zoologist, and some modern biologists similarly toyed with the question of what it would mean for the zoologist to be a novelist or poet "in his spare time." H.G. Wells, D.H. Lawrence, and Virginia Woolf, like Quarles, played with the parallels between humans and animals in their writing, but their zoological inclinations took other forms as well—they also found animals' strangeness and differences from humans aesthetically compelling and a fit subject for literature. Meanwhile, biologists such as Julian Huxley, J.B.S. Haldane, and Charles Elton, along with the filmmakers behind the natural history series *Secrets of Nature*, explored "literary" problems such as the use of metaphor and the role of affect in scientific

¹ Aldous Huxley, *Point Counter Point*, 315. Alverdes and Wheeler are Friedrich Alverdes, author of the 1927 *Social Life in the Animal World*, and William Morton Wheeler, an entomologist who studied social insects.

representations of animals.² These figures' works are zoological in the sense that they reveal a shared fascination with animals, and modernist in the sense that they self-consciously grapple with the seeming impossibility of capturing those animals in language or images, an impossibility that drives them to experiment in their animal representations. Together, they make up a cultural formation that I am calling zoological modernism.

Scholars have rarely discussed the relationship between early twentieth-century literature and zoology, a surprising omission considering how central biology and natural history have become to Victorian studies. It is almost as if, following Darwin's death in 1882, biology fell off the cultural map. But in fact, the biological sciences enjoyed a new flowering in early twentieth-century Britain. Biologists, newly institutionalized in universities and field stations, ushered in a new era of fieldwork centered on living animals and plants. Amateur natural history also flourished in this period, gaining momentum from new technologies such as the handheld camera and the cinema. Zoology was not confined to the laboratory; through books, articles, and films, it seeped into popular and intellectual culture. In short, zoology was as much a part of the "spirit of the age" in 1920 as it was in 1860.

In bringing works of literary modernism and modern zoology together under the umbrella of "zoological modernism," I am tracing conversations between writers and scientists that are not just metaphorical; they are also part of the historical fabric of British culture in the early twentieth century. Indeed, no one was more attuned to these exchanges than Aldous Huxley. A keen observer of modernist literary and artistic culture, Huxley depicts in his novels a milieu in which biologists, artists, writers, and socialites mingle in drawing rooms, restaurants, and laboratories, and in which their ideas cross-pollinate each other. He did not make up these

² Huxley and Haldane were also quite literally poets in their spare time; both wrote verse and short stories in addition to their scientific work.

encounters out of whole cloth. Instead, they were modeled on those of his own friends and acquaintances. The brother of Julian Huxley, a friend of D.H. Lawrence, and a close associate of the Bloomsbury group that included Virginia Woolf, Vanessa Bell, and Roger Fry, Aldous Huxley belonged to a social circle that brought together modernist writers and modern biologists. Each of the writers I discuss in this dissertation—Wells, Lawrence, and Woolf—knew zoologists and read zoological texts.³ Conversely, each of the scientists I discuss had some acquaintance with twentieth-century art and literature. Figure 1 illustrates the social network that links the primary figures of this dissertation. Given these biographical ties, it is little wonder that these modern biologists and modernist writers exhibit mutually influential ideas about animals.

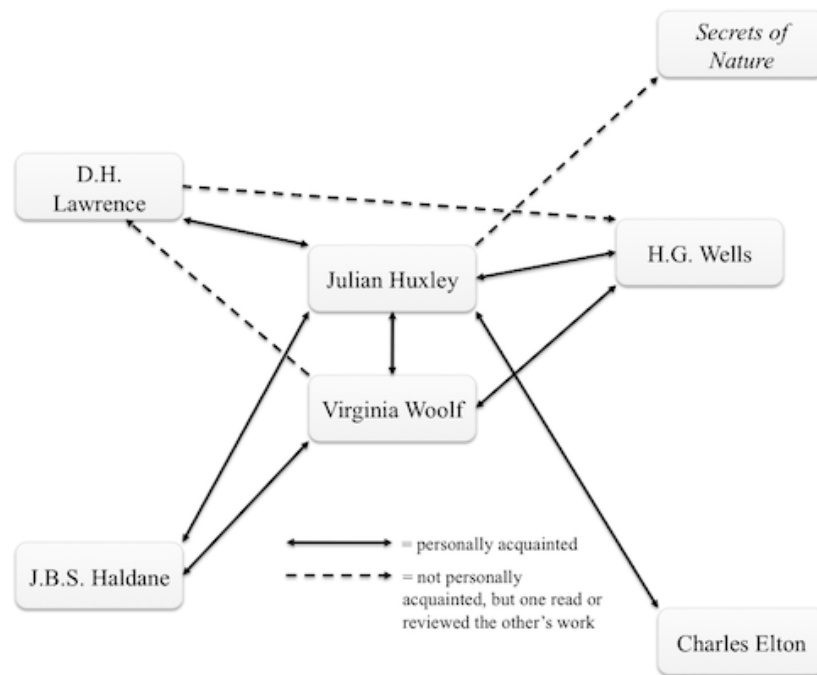


Figure 1

³ Although the zoologists I discuss were writers too, in this introduction I use the term “writers” to refer specifically to writers of literary fiction and poetry.

There is thus good historical reason to consider how modernist literature and modern zoology influenced each other, but there is also a theoretical reason to explore this relationship. In juxtaposing modernist literature with modern zoology, my dissertation aims to redress a problem in the extant scholarship on modernism and animals. This scholarship, despite its sensitive readings and powerful theoretical frameworks, has found curiously little to say about actual, material animals dwelling in the modern world. Instead, most critics see animals as playing primarily symbolic roles in modernist discourse, usually representing humans' pre-modern past. Carrie Rohman, for example, in *Stalking the Subject*, situates modernism's animals in between Darwin and Freud, where they become markers of either our evolutionary past or the unconscious, itself an atavistic force. For figures like Freud, D.H. Lawrence, and Djuna Barnes, Rohman argues that animality represents a return to a long-repressed primitive nature.⁴ Other critics, such as John Berger and Akira Mizuta Lippit, associate modernity with "the disappearance of animals from everyday life," tracing our growing alienation from animals in the nineteenth and twentieth centuries as they are relegated to zoos, movie screens, and children's books.⁵ These approaches have been useful in understanding how animals signify in modernity and modernism, but in their shared vision of animals as part of a lost past, they risk overlooking something of which many modernist writers were keenly aware: the real, material presence of animals in the modern world.

In focusing on animals as symbols of the past or the unconscious, we may also risk reproducing modernism's own discourses of primitivism, plugging in animals for the so-called

⁴ Rohman, *Stalking the Subject*, 1-7, 21-27, 142-144, and passim. Philip Armstrong makes a related argument about primitivism in *What Animals Mean in the Fiction of Modernity*, claiming that modernist animal representations reflect a desire to "break loose, go feral and return to a revitalizing savagery," a desire most clearly expressed in the rhetoric of the hunt (134).

⁵ Berger, *About Looking*, 19; Lippit, *Electric Animal*.

primitive people that nineteenth- and twentieth-century writers simultaneously admired and marginalized. We know, from scholars such as Rayna Green and Philip J. Deloria, that the myth of the “vanishing Indian” in the nineteenth and twentieth centuries was a specific ideological fantasy rather than a transparent fact—that is, that while large numbers of Native Americans really were dying or being displaced, the “cult of the vanishing Indian” was more a cover for than a challenge to that violence.⁶ And we know, from scholars such as Simon Gikandi and Michael North, that when Anglo-American modernist writers praised “primitive” people for their authenticity or imitated “primitive” aesthetic practices, they furthered an essentialist ideology that excluded non-white people from categories like “modernity” or “art.”⁷ We might be suspicious, then, of criticism that takes the vanishing animal or the animal primitive as transparent facts. I do not believe that the discourse of the vanishing animal is morally equivalent to that of the vanishing Indian, or that animal primitivism is morally equivalent to a primitivism that exoticizes and silences human others. Many of the ethical problems stemming from modernist primitivism—including its complicity with racist ideology and its erasure of “primitive” people’s self-representations—do not apply to animal primitivism, or do not apply in the same ways. But I do believe that they are structurally similar, and structurally flawed, discourses, which project a fantasy of primitive, authentic Being onto a heterogeneous group of real beings. This is as much an epistemological problem as it is an ethical one; the structures of

⁶ Rayna Green, “A Tribe Called Wannabee,” 49, and Philip J. Deloria, *Playing Indian*. Michael North, in *The Dialect of Modernism*, also points to the role of the “disappearing Negro” trope in early twentieth-century U.S. culture, which “functioned as wish fulfillment, revealing the barely submerged hope that the freed slaves would simply die off” (22).

⁷ See Gikandi’s “Picasso, Africa, and the Schemata of Difference,” which shows how Picasso’s primitivist art appropriated African art objects but ignored the African people who made them, and Michael North’s *The Dialect of Modernism*, which argues that while Anglo-American modernists were writing in dialect and performing acts of racial masquerade as a way of being rebellious and modern, African-American modernists were developing strategies to free themselves from dialect as it was practiced by white writers.

animal primitivism can blind us to zoological modernists' investment in the project of creating knowledge about real, living animals. We must maintain a critical distance from animal primitivism if we are to register the ways real animals—including pets, common birds and insects, and animals in zoos and laboratories, as well as more authentic-seeming wild predators—dwell in the modern world and figure in modernist literature and science.

Part of the reason for the critical focus on animals as symbols is that literature is a representational and highly symbolic medium, and thus seems opaque to questions about actual, material animals. We may, as Timothy Clark observes, read literary animal representations as symbolically mapping out our own cultural concerns, or as reflecting on the constructedness of our very ideas about animals; but it seems that such representations “can say nothing about the non-human as such.”⁸ Zoology, on the other hand, has a more direct relationship to real animals, in that zoologists study real animals in their everyday work with the goal of establishing empirical knowledge about them. Zoological writing is, of course, also a linguistic genre that negotiates questions about textual representation—for example, what counts as anthropomorphism or what analogies are most useful. But if zoology necessarily, and self-consciously, falls short of its aspiration to give immediate knowledge of animals in a neutral language, it nevertheless keeps real animals in its sights. When we consider zoology alongside literary texts, we can begin to see how novelists and poets also kept real animals in their sights, keying in on their particularities rather than focusing exclusively on their symbolic uses. In reading modernist writers *as* zoologists and vice versa, I suggest that both groups worked to find a balance between matter and language, a way to attend to both the animals they observed and the many possibilities for representing them.

⁸ Timothy Clark, *The Cambridge Introduction to Literature and the Environment*, 191.

Zoologists and writers did not always agree on how animals should be understood and represented, but a few common ideas about animals emerge from zoological modernism. These figures share an interest in looking at animals from an intellectual and aesthetic perspective. While many of the scientists and writers that I discuss did indeed love animals, they tend to write not as animal lovers but as thinkers fascinated by animals (an unsurprising tendency given science and modernism's shared dread of the sentimental). Although they flirt with abstract philosophies of the animal, zoological modernists are more interested in real, specific animals than in a disembodied concept of animality. They look at birds and snails because they want to understand more about birds and snails, not because they want to unleash the animal within. Even D.H. Lawrence, a neo-Romantic writer who *did* want people to find their inner animal, also sometimes expresses a desire to get at the particularity of animals without cloaking them in anthropomorphic symbolism. Perhaps most importantly, zoological modernists apply an objectifying gaze, whether scientific or aesthetic, to animals, but do not turn a blind eye to animal subjectivity. They explore animals' social lives, emotions, and consciousness, and they believe that animals exercise agency even in a modern world largely shaped by humans.

Located at the intersection of literature, culture, and the history of biology, my dissertation aims to unsettle the received understandings of modernist literature and modern science. In the texts of zoological modernism, encounters with animals transfigure traditional versions of empirical and aesthetic perception. Modern biology, in my account, is more flexible than literary critics might expect. It does not simply amount to an ideology of objectivity, instrumental reason, and mastery through knowledge.⁹ Instead, it self-reflexively grapples with

⁹ Historians and sociologists of science have recognized for some time that the common perception of science as an enterprise of impersonality, objectivity, and disenchantment does not fully explain science in practice. Most notably, Lorraine Daston and Peter Galison have

the philosophical problems of how humans can know and represent other animals. Its anxieties about epistemology and linguistic representation emerge from the same crises of reason and representation that have been commonly associated with aesthetic modernism. Modernist literature, meanwhile, is more worldly than many critics assume. The modernist writers I discuss were well acquainted with modern biology and found artistic inspiration in animal others. The creatures in their texts are not just symbols of myth, prehistory, or the Freudian unconscious; they are also representations of real, corporeal animals, the kind studied by zoologists. In zoological modernism the Great Divide of science and literature, to borrow a phrase from Donna Haraway, “flatten[s] into mundane differences.”¹⁰ Modern zoology and modernist writing never collapse into identity with one another, but their ideas about animals co-evolve in ways that reveal relationality, not rupture; one culture, not two.

Darwin and Twentieth-Century Zoology

Like most historical accounts of modern biology, this one begins with Charles Darwin, who is, to my mind, the first zoological modernist. There is, to be sure, a Victorian Darwin, the gentleman-naturalist who envisioned life as an “entangled bank” and history as a gradual,

historicized the concept of objectivity, showing how it is only one of multiple “epistemic virtues” and how, in the twentieth century, it came to be largely replaced by “trained judgment,” in which the trained scientist could use his or her intuition to produce “interpreted images” (46). Steven Shapin writes that there is a mismatch between the public perception of modern science—as an impersonal, collective institution—and “the rich repertoires of affect-saturated familiarity that one uncovers when looking closely at quotidian institutional practices” (*The Scientific Life*, 2). Eileen Crist’s *Images of Animals*, focusing specifically on zoology and natural history, shows how anthropomorphism and representations of animal subjectivity have not always been considered what we might call epistemic vices; in Darwin’s biology and turn-of-the-century natural history, such approaches were common, and only with the advent of Lorenzian ethology in the 1930s and 40s did anthropomorphism and subjectivity come to be excluded from scientific study of animals.

¹⁰ Haraway, *When Species Meet*, 15. She, and I, borrow the term “Great Divides” from Bruno Latour’s *We Have Never Been Modern* (11-12).

continuous process. This Darwin has often been perceived as an influence on the intertwined plots and narrative unfoldings of the realist novel.¹¹ But there is also a modernist Darwin, an iconoclast whose work destabilized Western metaphysics in ways that British culture required many years to assimilate.¹² For zoological modernism, Darwin's influence took many forms. First, his evolutionary theory had significant philosophical implications about the place of humans in the biological order. Second, he made use of rather conventional analogies between human and animal behaviors, analogies that echo in twentieth-century writing, but he simultaneously recognized the dangers of anthropomorphic metaphor. Third, his work reveals an affective and aesthetic response to other species that presages the zoological modernists' attraction to conventionally unbeautiful creatures such as fish, bats, and insects. Finally, his research lays the foundation for late nineteenth- and early twentieth-century natural history and biology, including the new specializations of ecology, ethology, and animal psychology.

One of the most widely recognized effects of Darwin's evolutionary theory is that it radically decenters the human. Its assumption that humans *are* animals, descended from animal ancestors and differing from them only by a continuous series of tiny gradations, contradicts the religious belief that humans were created in the image of God. Furthermore, the theory implies that modern humans are hardly the pinnacle of evolutionary development, but instead represent a mere blip in evolutionary history. This decentering led Freud to identify Darwin's evolutionary

¹¹ Most notably, Gillian Beer's *Darwin's Plots* links the comparative structures, web-like fictional worlds, and concern with descent of George Eliot's novels to Darwinian science (139-195); and George Levine's *Darwin and the Novelists* argues that the Darwinian imagination made its mark on Victorian novels in their emphases on change and history, ecological and genealogical connections, hidden order, and a denial of teleological design (16-20).

¹² For example, Carrie Rohman claims, in *Stalking the Subject*, that the Victorians attempted to integrate Darwin into a humanist and anthropocentric worldview, but toward the end of the nineteenth century, evolutionary theory's threatening implications for humanism became clear (5).

theory as one of three great blows, or wounds, to human narcissism (the other two being the Copernican revolution and psychoanalysis).¹³ There is another side to this wound, however, which has been observed by scholars including Gillian Beer and George Levine. In toppling humans from their place of hierarchical preeminence, evolutionary theory made us recognize our kinship with other animals.¹⁴ For some of Darwin's followers, including many zoological modernists, this sense of relatedness with the nonhuman world softened evolution's blow to the human ego and provided a scientific rationale for feelings of empathy toward animals. The Darwinian world is, in Levine's words, "full of creatures profoundly akin to ourselves," and this kinship could be as pleasurable as it was disturbing.¹⁵

The kinship among all forms of life, suggests Beer, authorized Darwin's liberal use of metaphor and analogy comparing other species to humans.¹⁶ His was an "anthropomorphic biology," using human terms and behaviors to explain the activities of other species.¹⁷ "Plants and animals in this mode of description appear as the dominant term with mankind serving as a means of explication," writes Beer; "the effect is to reproduce in the mode of explanation the structures of relationship in Victorian society."¹⁸ For example, Darwin uses the language of colonialism to explain how species migrate and displace one another over time. Yet this anthropomorphism is a sticky point for Darwin, because these metaphors tend to exceed their original context and be interpreted as literal truth. Although Darwin insists that plants and animals were engaged in a "struggle for existence," he is careful to include a caveat:

¹³ Gillian Beer, *Darwin's Plots*, 8-9.

¹⁴ Beer, *Darwin's Plots*, 56-58; Levine, *Darwin Loves You*, 210.

¹⁵ Levine, *Darwin Loves You*, 210.

¹⁶ Beer, *Darwin's Plots*, 51-52.

¹⁷ *Ibid.*, 52.

¹⁸ *Ibid.*, 52.

I use the term Struggle for Existence in a large and metaphorical sense, including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving progeny. Two canine animals in a time of dearth, may be truly said to struggle with each other which shall get food and live. But a plant on the edge of a desert is said to struggle for life against the drought, though more properly it should be said to be dependent on the moisture.¹⁹

The appropriate use of metaphor remained a challenge for twentieth-century biologists and writers. They, like Darwin, made liberal use of anthropomorphism in describing animals' activities, but often took care to warn audiences that, in Charles Elton's words, the analogies "are simply intended as analogies and nothing more."²⁰ Such analogies seemed almost indispensable to writing about animals, but they always ran the risk of mutating into naïvely anthropomorphic claims about how animals really are, or worse, into social Darwinist claims about the way nature "intends" human society to function.

Anthropomorphism and kinship are ways of conceptualizing humans' similarities to other animals, but Darwin's writing reveals an affective and aesthetic response to nonhuman species that is not limited to the revelation of surprising similarities. He also registers a sense of wonder at animal difference, at the strange beauty of such unlikely creatures as microorganisms, barnacles, and worms. Finding the marvelous in the most grotesque or abject of creatures was one of his specialties. Writing of his work on earthworm castings, Jonathan Smith memorably says, "Darwin had long been fascinated by nature's oddities, yet here was, arguably, the apex of the Darwinian grotesque: worm shit, lovingly rendered as an object of wonder."²¹ Changing and unconventional ideas of beauty have often been considered a hallmark of modernist art and literature—for example, Matei Calinescu describes modernist aesthetics as a transitory kind of beauty associated with strangeness, mystery, and even ugliness—and zoological modernism is

¹⁹ Darwin, *Origin of Species*, 62.

²⁰ Elton, *Animal Ecology*, viii.

²¹ Smith, *Charles Darwin and Victorian Visual Culture*, 247.

especially sensitive to this strange beauty.²² It inherits from Darwin a feeling of wonder toward other species, especially those animals—fish, octopi, mosquitoes, snails—that seem most inhuman and, at first glance, least attractive. Levine describes this affective dimension of Darwin’s work as a secular re-enchantment of the world and gives it an ethical thrust—“An enchanted, secular vision seeks a feeling for the organism, values the extraordinary differences that mark the range of organic life, and depends on imagination (anthropomorphic perhaps, but not anthropocentric), honoring difference, recognizing penguins for penguins.”²³

Whether this sense of wonder at the strangeness and diversity of the animal world can be a foundation for animal ethics, or whether it leads only to an empty form of aestheticization, is a matter for debate. One side, exemplified by scholars like Levine, sees the aesthetic as a potentially (though not necessarily) ethical form of affect, one that “allows, even if it only occasionally achieves, a vital sense of the other.”²⁴ For Levine, this means that Darwin’s re-enchantment of the living world can work to “energize the ethical,” to give us a critical momentum to live better with other creatures.²⁵ The other side, exemplified by scholars like Timothy Morton, considers the aesthetic to be ideologically compromised. For Morton, the problem is that the aesthetic is a phenomenon of distance, and thus sanctions the very separation between us and them that undergirds exploitation of the other in the first place.²⁶ Morton suggests that the solution is not to look at “nature” or animals from a distance, but to “jump down into the mud” with them, a practice that can help us cultivate love for, rather than aesthetic

²² Calinescu, *Five Faces of Modernity*, 45-46, 53-54, and passim.

²³ Levine, *Darwin Loves You*, 274.

²⁴ Levine, *Aesthetics and Ideology*, 17.

²⁵ Levine, *Darwin Loves You*, 254.

²⁶ Morton, *Ecology Without Nature*, 24-26.

appreciation of, the kind of abject and slimy creatures that so fascinated Darwin.²⁷ My own position is that the aestheticization of other creatures typical of zoological modernism neither necessitates nor forecloses any particular ethical program. It has ethical potential, but this potential, rarely developed by zoological modernists, is left instead for readers to contemplate. What is clear is that Darwin's sense of wonder at animal strangeness became a common feature of literary and scientific representations of animals in the early twentieth century, recognizable in Woolf's sensuous snail, Lawrence's mysterious fish, and the *Secrets of Nature's* wriggling aphid.

These aspects of Darwin's writing reverberated throughout the literature, art, and philosophy of late-Victorian and modernist Britain, but his work also influenced the development of biology in more specific ways. It planted the seeds for the new biological subdisciplines that emerged in the late nineteenth and early twentieth centuries. Darwin was thinking ecologically before ecology was a word, much less a science. *The Origin of Species* offers many apt illustrations of Darwin's relational vision, most famously this passage in the book's conclusion:

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us.²⁸

Darwin recognized the importance of environment in determining the course of species evolution, an environment that includes factors such as climate, soil, and other plants and animals. He also acknowledged that the numbers of animals play a major role in interspecies relationships and natural selection, presaging the quantitative methods of later ecologists like Charles Elton. These relationships would form the basis of ecology for the next generation of

²⁷ Ibid., 205, 157-160.

²⁸ Darwin, *The Origin of Species*, 489.

scientists. We might consider 1913 to be the year of scientific ecology's formal debut in Britain—in this year the British Ecological Society was founded and the *Journal of Ecology* established. But this watershed moment was the culmination of a series of proto-ecological works, of which few were more important than *The Origin of Species*.

Darwin was also an attentive student of animal behavior, which he considered subject to natural selection just as morphological structures and physiological processes were. *The Descent of Man* provides ample evidence of his encyclopedic knowledge of animal behavior, from the sleeping habits of chimpanzees to the courtship rituals of insects. Ethology, the study of animal behavior, was another new branch of zoology that emerged in the wake of Darwin's work. Most professional Victorian biologists studied morphology, or the physical structures of plants and animals, using preserved specimens rather than live organisms. Darwin preferred to study living creatures in outdoor spaces, and thus animal behaviors were more accessible to him as an object of inquiry than to his peers. Many twentieth-century biologists, including Julian Huxley, Konrad Lorenz, and Niko Tinbergen, shared Darwin's taste for fieldwork and established the subdiscipline of ethology to study what animals do in their ordinary habitats. Though the foundations of ethology are usually traced to the 1930s, Huxley was doing ethological work as early as 1914, when he published a landmark paper on the courtship habits of the great crested grebe. Like ecology, ethology grew out of a Darwinian strand of natural history based on field observations and focused on animals' everyday lives.²⁹

²⁹ In this claim I am in agreement with Christina Alt, who argues that British biology and natural history underwent a shift, around the turn of the century, from a focus on collecting and classifying specimens to a focus on studying living organisms in their natural environment, and that the birth of ecology and ethology was a major part of that shift. See *Virginia World and the Study of Nature* (1-3).

The last new subdiscipline that this dissertation addresses is animal psychology. Closely related to ethology, animal psychology studies the mental habits of animals in order to better understand the workings of instinct, intelligence, and perception. Darwin's *Descent of Man* is an important foundational text for this field. Insistent that biological continuity between humans and other species applies to mental as well as physical traits, Darwin explored the presence in nonhuman animals of ostensibly human characteristics such as the ability to learn, the sense of curiosity, and the power of reason. "There is," he declared, "no fundamental difference between man and the higher mammals in their mental faculties."³⁰ Darwin's protégé George Romanes and Romanes's colleague C. Lloyd Morgan attempted a more systematic study of animal psychology than Darwin had, and helped to launch the field in the late nineteenth century. Romanes's *Animal Intelligence* (1883) and Morgan's *Animal Life and Intelligence* (1891) were particularly important in formalizing the study of animal minds. Soon specialists in animal psychology were ensconced in university laboratories, working side by side with human psychologists; and their ideas about animals' inner lives influenced zoological modernists from J.B.S. Haldane to Virginia Woolf.

Although I have been focusing on the development of twentieth-century professional biology, it is important to note that popular biology, too, expanded into new territory during these years. Julian Huxley, J.B.S. Haldane, and H.G. Wells were particularly adept popularizers of science and wrote numerous books and articles for lay audiences. Natural history, which had always been a popular phenomenon, also continued to flourish even in the age of academic biology, finding a new means of dispersal in the cinema. From the microcinematographic films of Charles Urban's *Unseen World* (1903) to the popular *Secrets of Nature* series (1922-33),

³⁰ Darwin, *The Descent of Man*, 35.

which I discuss in Chapter Three, the nature film industry enhanced and capitalized on the appeal of biology for non-specialists. Darwin, too, was a naturalist at heart, writing for general as well as scientific audiences, and gifted at communicating to ordinary people both his biological knowledge and his affective response to the living world. These gifts continued to be valued in scientific thinkers throughout the modernist period.

The Name and Nature of Zoological Modernism

In 1924 Virginia Woolf visited the new aquarium at the London Zoological Gardens. This visit to the aquarium proved artistically stimulating, engendering a poetically descriptive review for *The Nation and Athenaeum*. The Zoo was a space where scientific research and education met modern forms of visual display, and Woolf found the sights of the aquarium congruent with her own modernist aesthetic values. She writes,

Aesthetically speaking, the new aquarium is undoubtedly the most impressive of all the houses at the zoo. Red fish, blue fish, nightmare fish, dapper fish, fish lean as gimlets, fish round and white as soup plates, ceaselessly gyrate in oblong frames of greenish light in the hushed and darkened apartment hollowed out beneath the Mappin terraces. Scientifically, no doubt, the place is a paradise for the ichthyologist; but the poet might equally celebrate the strange beauty of the broad-leaved water plants trembling in the current, or the sinister procession of self-centred sea-beasts forever circling and seeking perhaps some minute prey, perhaps some explanation of a universe which evidently appears to them of inscrutable mystery. Now they knock the glass with their noses; now they shoot dartlike to the surface; now eddy slowly contemplatively down to the sandy bottom. Some are delicately fringed with a fin that vibrates like an electric fan and propels them on; others wear a mail boldly splashed with a design by a Japanese artist. That crude human egotism which supposes that Nature has wrought her best for those who walk the earth is rebuked at the aquarium. Nature seems to have cared more to tint and adorn the fishes who live unseen at the depths of the sea than to ornament our old, familiar friends, the goat, the hog, the sparrow, and the horse.³¹

Terrestrial animals such as horses have long been objects of admiration for a more realist school of nature lovers, but Woolf sees in marine creatures a “strange,” “sinister” beauty, reminiscent of

³¹ Woolf, *Essays*, vol. 3, 404-405.

the Japanese art forms that inspired—and were appropriated by—Oscar Wilde, Ezra Pound, Marcel Proust, and others.³² Her article associates the aquarium with modernist aesthetics, locating in the Victorian, domesticated space of the zoo something new and strange.

Woolf's review is telling not only because it links scientific display to aesthetic novelty, but also because it continues the Darwinian project of decentering the human. Biologists might not be on board with Woolf's personification of "Nature," but they probably would share her vision of smashing "that crude human egotism" that assumes the earth was designed for man. Part of what Woolf finds so appealing about the fish is their "self-centred" nature, their agency in motion, which is sustained even when the fish are displaced into tanks in the middle of metropolitan London for people to look at. These fish are moving, thinking beings that look back at humans—"knock[ing] the glass with their noses"—rather than mere aesthetic objects. And this mysterious kernel of subjectivity fascinates Woolf as much as the fish's colors and forms do. The review weaves together modernist aesthetics and a Darwinian outlook in a way that is emblematic of zoological modernism.

The "zoological" of the phrase "zoological modernism" is fairly self-explanatory, referring to the scientific study of animals, but it is less obvious what the "modernism" means. This question is particularly pressing because this dissertation revolves around an assortment of figures that is fairly unconventional for modernist studies. Woolf has come to be seen as one of the central figures of British modernism, but the other writers I discuss in this dissertation are often perceived as having a more oblique relationship to modernism, and the scientific figures

³² On modernism's relationship with Japan and Japanese art, see Yoko Chiba's "Japonisme: East-West Renaissance in the Late 19th Century," Andrew Thacker's "Mad After Foreign Notions": Ezra Pound, Imagism and the Geography of the Orient," Jan Hokenson's "Proust's *Japonisme*: Contrastive Aesthetics," and Rupert Richard Arrowsmith's *Modernism and the Museum* (103-127).

none at all. D.H. Lawrence is usually understood as an oppositional figure to the Eliot-Pound-Joyce axis of modernism; Michael Bell calls him “the repressed conscience of modernism,” while Hugh Stevens describes him as “something like an ecological anti-modernist.”³³ Wells, on the other hand, is seen as a different kind of oppositional figure, a residual realist from an earlier era.³⁴ As for Julian Huxley, Charles Elton, J.B.S. Haldane, and the *Secrets of Nature* filmmakers, their brand of science has been overshadowed by the modern physics of Einstein and Heisenberg, whose relativity theory and uncertainty principle have seemed, to modernist scholars, to hold an obvious attraction for a generation of writers dissatisfied with Victorian positivism. The term “modernism” thus requires some explanation.

I define modernism in a fairly conventional way, as a movement in late nineteenth- and early twentieth-century cultural production that valued experimentation, drew attention to form and medium, and engaged with widespread cultural anxieties about knowledge and representation. Rather than casting off this old-fashioned definition, my dissertation applies it to writers, like Wells and Lawrence, who are often placed on the margins of modernism, and to biologists who rarely appear on the modernist map at all. Extending the mantle of modernism to new writers and texts can be a fraught critical move. Too often, claiming a text as modernist or not-modernist seems to be a judgment of literary value, in which modernist texts accrue a kind of cultural prestige that is denied to modernism’s others—whether Victorian literature, modern-but-not-modernist texts, or popular culture. I do not believe that works from the early twentieth century must be modernist to be worth reading, or that Victorian, modern, and popular works are

³³ Bell, “Lawrence and Modernism,” 194; Stevens, “D.H. Lawrence: Organicism and the Modernist Novel,” 137.

³⁴ A few recent monographs on British modernism, however, including Rohman’s *Stalking the Subject*, Jed Esty’s *Unseasonable Youth*, and Carey J. Snyder’s *British Fiction and Cross-Cultural Encounters*, have included extensive readings of Wells, reflecting modernist studies’ turn toward a more inclusive view of twentieth-century literary culture.

aesthetically naïve in comparison to modernist texts. Nor do I believe that early twentieth-century texts have a monopoly on the characteristics usually designated as modernist. But I deploy the term “modernist” to talk about literary and zoological works in this dissertation because the traits that have been commonly labeled “modernist”—a self-consciousness about language, an aesthetic of defamiliarization, and a belief in the instability of knowledge, to name a few—prove useful as a way of prising open these works’ representational tactics and philosophical concerns.

Expanding the bounds of what counts as “modernist” is, of course, a time-honored tradition in modernist studies. Since the 1980s, modernist scholars have found the traditional canon of high modernism—a group of formally innovative texts by Ezra Pound, T.S. Eliot, James Joyce, Wyndham Lewis, and a few associates—increasingly unsatisfactory as a way of understanding early twentieth-century literary production.³⁵ This grouping excluded many non-European, African-American, and women writers, and at one point in history it excluded even Woolf, whose writings were scorned by Wyndham Lewis as no more than “pretty salon pieces” and by Hugh Kenner as “village gossip from a village called Bloomsbury.”³⁶ Today, while Woolf has been inaugurated into the modernist canon, and Lawrence acknowledged to be at least arguably a part of it, Wells is often still perceived as a retrograde, un-modernist writer. It is true

³⁵ In their 2008 article “The New Modernist Studies,” Douglas Mao and Rebecca Walkowitz explore two of the most recent iterations of this expansion—the “transnational turn,” and the “vertical expansion” that allows works from mass culture to be analyzed through the lens of modernism. In the introduction to *Bad Modernisms*, Mao and Walkowitz trace this trend of expansion back to the 1980s, in which feminist scholars brought attention to modernist women writers including Woolf, Katherine Mansfield, and Rebecca West, and scholars of African-American literature showed how jazz and Harlem Renaissance writing reflected an African-American modernism that importantly counters Anglo-American “high modernism.” See *The Gender of Modernism*, edited by Bonnie Kime Scott, and Houston Baker’s *Modernism and the Harlem Renaissance* for particularly significant interventions in this earlier expansion of modernist studies.

³⁶ Lewis, *Men Without Art*, 137; Kenner, “The Making of the Modernist Canon,” 57.

that Wells was engaged in a very different literary project from many of his contemporaries, that he consciously positioned himself against such writers as Henry James and James Joyce, and that Woolf herself criticized his novels for being too “materialist” and “Edwardian.” But this does not mean that Wells was not a literary experimenter—indeed, his science fiction writings of the 1890s were quite innovative and helped to create a new genre.³⁷ Nor does it mean that he was disengaged with literary culture or twentieth-century modernity. Furthermore, even writers routinely classified as modernists often had contradictory ideas about literary form and style; witness Pound’s quarrel with Amy Lowell and the later Imagists, Woolf’s criticism of *Ulysses*, and Lewis’s hatred of Bloomsbury. Even if we continue to associate literary modernism with a specific investment in formal experimentation and self-reflexive style—and I think this association continues to be useful—we are left with a rather big modernist tent that covers many different ideas about literary aesthetics, from Wells’s to Pound’s to Woolf’s.

Given modernist studies’ recent emphasis on expanding the canon, it will not seem particularly controversial to include Woolf, Lawrence, and Wells in my proposed category of “zoological modernists,” but it may still raise eyebrows to place biologists and natural history filmmakers in this group. Yet zoological writings and zoological films belong to the same intellectual movement as modernist literature, a movement that sought to understand and respond to the shifting currents of modern life and knowledge. The typical narrative of modernism’s intellectual history goes something like this: By the mid-nineteenth century, scientific positivism had become the dominant philosophy of the English intelligentsia. The scientist was considered

³⁷ Indeed, one intervention of the “new modernist studies” has been to expand the notion of literary experimentation. Works such as *High and Low Moderns*, edited by Maria DiBattista and Lucy McDiarmid, and Joshua Miller’s *Accented America* have shown that modernist experimentation was not limited to the likes of Pound, Eliot, and Stein, but also characterized the projects of lesser-known or less celebrated writers.

the voice of authority, a voice that advocated a materialist, secular understanding of the world. In the realist novel positivism found a literary counterpart, and together they seemed to project a general optimism that reason and empiricism could produce stable, verifiable knowledge about the world.³⁸ Around the turn of the century, however, developments in the sciences and philosophy led to what James McFarlane calls “the fragmentation of the positivistic world.”³⁹ Literary modernism took shape against the backdrop of Heisenberg’s uncertainty principle, Einstein’s relativity theory, and “the world changed and reinterpreted by Marx, Freud, and Darwin,” to quote McFarlane and Malcolm Bradbury.⁴⁰ While Darwin’s theory implied that the human mind was a product of natural evolutionary processes, Einstein showed how measurements are not absolute but depend on the position and velocity of the observer, and Freud persuaded people that their actions were influenced by unconscious forces of which they were not even aware. According to Michael Bell, as developments in the natural sciences contributed to the undoing of scientific hegemony, modernist writers “deliberately used science as just one of the possible orders of understanding rather than as the ultimate form of truth statement.”⁴¹

What I want to add to this narrative of modernism’s intellectual history is that modern biology, like modern physics and modernist literature, continued to work through problems of epistemology and representation rather than clinging to the Victorian ideals of scientific objectivity and authority. Modern physics and psychoanalysis often get most of the credit for

³⁸ As John Kucich’s “Scientific Ascendancy” argues, “Scientific and novelistic discourses shared epistemological principles, as well as philosophical attitudes and professional concerns.” See also George Levine’s *Realism, Ethics and Secularism* for an account of how the secularism underlying Victorian science impacted the realist novel.

³⁹ McFarlane, “The Mind of Modernism,” 83.

⁴⁰ Bradbury and McFarlane, “The Name and Nature of Modernism,” 27.

⁴¹ Bell, “The Metaphysics of Modernism,” 12.

injecting ideas about relativity, uncertainty, and immaterial forces into modernist culture; biology, meanwhile, has been seen as stubbornly materialist and mechanistic, stuck in the Victorian era. But biologists like Huxley and Haldane were keenly aware of the modernist challenges to positivism and objectivity that emerged from other corners of the scientific world. Huxley wrote an essay about “biological relativity,” exploring how the biological states of animals and humans affect their observations of the world; Haldane, meanwhile, regularly applied the insights of modern physics to biology, suggesting in one essay that the wave theory of matter and the study of insect psychology would destabilize Western metaphysics in similar ways.⁴² The study of animals also produced its own particular challenges to positivism. Conwy Lloyd Morgan, one of the founders of animal psychology, recognized that his discipline could never be truly objective, for “we cannot think of [animals] in any other terms than those of human consciousness.”⁴³ J.B.S. Haldane seemed to take a certain pleasure in these epistemological limitations, declaring, “I do not feel that any of us know enough about the possible kinds of being and thought, to make it worth while taking any of our metaphysical systems very much more seriously than those at which a thinking barnacle might arrive.”⁴⁴ The biological sciences, including zoology, proceeded on a shaky epistemological ground in the early twentieth century, and biologists frequently acknowledged this to be the case.

The commonplace that modernism emerged from a crisis of representation, as well as one of reason, also applies to zoological modernism. Bradbury and McFarlane contend that for modernists, “public notions of language have been discredited and... all realities have become subjective fictions,” and this current of thinking led zoological modernists, along with many of

⁴² Huxley, *Essays of a Biologist*, 150; Haldane, *Possible Worlds*, 283-285.

⁴³ Morgan, *Animal Life and Intelligence*, 335.

⁴⁴ Haldane, *Possible Worlds*, 280.

their peers, to attempt to represent the world in innovative and self-conscious ways.⁴⁵ Even Wells, who became a stalwart of realist fiction after 1900, stages in his fin de siècle stories the new subjectivism, using narrative frames to undercut realism's epistemological authority. And in their zoological writing, Huxley, Haldane, and Elton find that there is no neutral, objective language on which to anchor their observations; instead, they must negotiate metaphors that constantly threaten to get away from them and words whose connotations run awry. In zoological films, images of microorganisms and insects similarly seem to lose their referential, mimetic status, becoming instead evocative abstract forms. As Peter Nicholls writes of modernism, "Where the symbolic medium of language should reaffirm a primordial bonding of word and meaning, writers like Baudelaire are increasingly aware of the inaccessibility of truth and the consequences of that for fantasies of harmony between mind and nature."⁴⁶ The zoologists and writers discussed in this dissertation are similarly aware of these problems. We may not find their works in the standard accounts of aesthetic modernism, but modernist scholars will find their self-consciousness about representation, their preoccupation with the gaps between perception, words, and world, uncannily familiar.

One of modernism's most vaunted strategies for getting at reality while self-consciously foregrounding the artistic medium is defamiliarization. Seeking to jolt their audiences out of their ordinary patterns of perception, to replace dead metaphors with living ones, modernist artists and writers invented new forms and styles to represent the world. Zoological modernists experimented with many different techniques of defamiliarization, from H.G. Wells's ecological allegories to the *Secrets of Nature*'s magnification of tiny creatures to Virginia Woolf's exploration of animal perspectives. When the Russian Formalist Viktor Shklovsky invented the

⁴⁵ Bradbury and McFarlane, "The Name and Nature of Modernism," 27.

⁴⁶ Nicholls, *Modernisms*, 21.

term “*ostranenie*,” translated as “defamiliarization,” in 1917, to illustrate the concept he turned to the Tolstoy story “Kholstomer,” a story which is focalized through the mind of a horse. “It is the horse’s point of view (rather than a person’s) that makes the content of the story seem unfamiliar,” writes Shklovsky.⁴⁷ Animal perspectives mark the birth of the term defamiliarization itself. It is little wonder, then, that zoological modernists found an aesthetic of defamiliarization apt for their own animal representations.

Zoological modernism, then, is a particular strand of the modernism that has been described by Bradbury and McFarlane, Pericles Lewis, and others. It shares with this modernism a sense of epistemological unease, linguistic self-consciousness, and anxiety about subjectivity. It shares also an intellectual backdrop of Darwin, Freud, and Einstein, and an aesthetic of defamiliarization and experimentalism. What sets zoological modernism apart, however, is its encounters with animals, creatures whose compelling otherness leads zoological modernists to recognize the limitations of human perception and representation, and nevertheless to renew their commitment to perceiving and representing animals. Perhaps Kafka’s Red Peter, in “A Report to an Academy,” put it best: “[W]hat I felt then as an ape I can represent now only in human terms, and therefore I misrepresent it, but although I cannot reach back to the truth of the old ape life, there is no doubt that it lies somewhere in the direction I have indicated.”⁴⁸ Zoological modernists recognize that they cannot create a transparently realistic representation of animals, but they also believe that a working understanding of animal lives lies somewhere in the direction they have indicated.

⁴⁷ Shklovsky, “Art as Technique,” 14.

⁴⁸ Kafka, *The Complete Stories*, 284.

Modernism and the Animal Turn

The new and growing field of animal studies shares with modernism the impulse to question Enlightenment ideas about knowledge, subjectivity, and language. As Kari Weil argues, animal studies “stretches to the limit questions of language, epistemology, and ethics... how to understand and give voice to others or to experiences that seem impervious to our means of understanding; how to attend to difference without appropriating or distorting it; how to hear and acknowledge what it may not be possible to say.”⁴⁹ This impulse to question is crystallized in the image of Derrida’s cat, an image that animal studies critics turn to again and again. In *The Animal That Therefore I Am*, Derrida narrates an encounter with his cat, describing the disarming feeling of being naked under its gaze. This animal, he writes, “can allow itself to be looked at, no doubt, but also—something that philosophy perhaps forgets, perhaps being this calculated forgetting itself—it can look at me. It has its point of view regarding me.”⁵⁰ The cat that looks back is itself a figure shared by modernist literature and animal studies—in *Ulysses*, Leopold Bloom contemplates his cat’s perspective, thinking, “Wonder what I look like to her. Height of a tower? No, she can jump me.”⁵¹ For Derrida as for Bloom, the cat’s gaze provides an impetus to reflect on its inner life. Derrida’s pet is a being who can look and experience, rather than a Cartesian machine, but it is also an other—“the wholly other, more other than any other.”⁵² It cannot ever be fully known or captured in language, and it prompts questions about human subjectivity as well as animal being, leading Derrida to ask, “Who am I, therefore? Who is it that I am (following)? Whom should this be asked of if not of the other? And perhaps of the cat

⁴⁹ Kari Weil, *Thinking Animals*, 6-7.

⁵⁰ Derrida, *The Animal That Therefore I Am*, 11.

⁵¹ James Joyce, *Ulysses*, 45.

⁵² Derrida, *The Animal That Therefore I Am*, 11.

itself?”⁵³ Animals pose a challenge to the Enlightenment dreams of transparent language and verifiable knowledge, including self-knowledge, which is not unlike the challenges posed by literature, science, and art in the modernist period.

The conventional account, however, is that modernism could have nothing to do with animals. As recently as 2000 Steve Baker proclaimed that “there was no modern animal, no ‘modernist’ animal... The animal is the very first thing to be ruled out of modernism's bounds.”⁵⁴ Baker attributes this disavowal partly to the modernists’ enthrallment with formalism and abstraction, and partly to their reaction against sentimental Victorian anthropomorphism. Many critics have characterized Victorians’ animal discourse as a way of working through concerns about human social structures; Victorian literature’s animals function primarily in an anthropocentric, often sentimental register.⁵⁵ For example, George Levine suggests that Diogenes, the untamed dog of Dickens’s *Dombey and Son* who is befriended by the loyal and submissive Florence Dombey, is a quintessential Victorian animal, serving as a reflection of the human characters around him.⁵⁶ Baker is right that this kind of symbolic animal is largely absent from modernist art and literature. And he is not alone in believing that animals more generally are absent from modernism. John Berger associates modernization with an increasing alienation from animals, and Akira Mizuta Lippit argues that the modern animal is a ghostly animal, one “in a state of *perpetual vanishing*.”⁵⁷ The vision of modernity as a time of urbanization,

⁵³ Ibid., 5-6.

⁵⁴ Baker, *The Postmodern Animal*, 20. Baker is speaking about modernist art, rather than literature; yet the close ties between visual arts and literature in the early twentieth century mean that his claim, if true, would have important implications for modernist literature.

⁵⁵ See Ritvo’s *The Animal Estate*; Levine’s “The Heartbeat of the Squirrel” in *Realism, Ethics and Secularism* (245-260); and *Victorian Animal Dreams*, edited by Deborah Denenholz Morse and Martin A. Danahay.

⁵⁶ Levine, *Realism, Ethics and Secularism*, 251.

⁵⁷ Berger, *About Looking*, 3; Lippit, *Electric Animal*, 1.

mechanical reproduction, and alienation from nature seems to preclude any significant role for animals in modernism.

There is, however, a small but growing contingent of literary critics who argue that animals play an important role in modernist literature. Margot Norris's *Beasts of the Modern Imagination* (1985) was the first important book in this vein; it argues that such modernists as Kafka, Lawrence, and Max Ernst represent a biocentric movement that elevates animality and challenges anthropocentrism.⁵⁸ More recently, Rohman's *Stalking the Subject* (2009) places animals and animal subjectivity at the center of modernism, where they disrupt the assumptions of Western humanism. Other scholars have applied animal studies approaches to particular modernist authors, including Woolf, Lawrence, Wells, Hemingway, Kafka, Faulkner, and Moore.⁵⁹

And yet, while this animal studies scholarship has successfully drawn attention to the importance of animals in modernist literature, it has not yet elucidated the ways that modernism's animals reflect and revise twentieth-century zoology. To be sure, Norris, Rohman, and others acknowledge Darwin's influence on modernist animals, but they do not discuss the post-Darwinian biologists that Lawrence, Woolf, Wells, and their contemporaries knew and read. We might turn to scholarship on modernism and science studies to fill this gap, but even here,

⁵⁸ Biocentrism is also the subject of Oliver A.I. Botar and Isabel Wünsche's edited collected *Biocentrism and Modernism* (2011). This collection investigates "nature-centric worldviews" in modernist art and design rather than literature, but it nevertheless is representative of the eco turn in modernist studies more generally (3).

⁵⁹ A partial bibliography of this scholarship includes Philip Armstrong's *What Animals Mean in the Fiction of Modernity* (which analyzes animals in Wells, Hemingway, and Lawrence, as well as eighteenth- and nineteenth-century fiction), Glen A. Love's "Hemingway Among the Animals" in *Practical Ecocriticism, Kafka's Creatures*, edited by Marc Lucht and Donna Yarri, Christopher T. White's "The Modern Magnetic Animal: *As I Lay Dying* and the Uncanny Zoology of Modernism," and Victoria Bazin's *Marianne Moore and the Cultures of Modernity* (151-198), as well as books and articles cited elsewhere in this dissertation.

the relationship between twentieth-century zoology and literature is still mostly uncharted territory. Critics have studied the impact of physics, anthropology, reproductive biology, and eugenics on modernism, but zoology, along with botany and microbiology, has been largely overlooked.⁶⁰ A major exception is Christina Alt's *Virginia Woolf and the Study of Nature*, which puts Woolf in conversation with twentieth-century biology and natural history; my dissertation builds on Alt's study by examining how Woolf borrowed and revised the discourse of animal psychology. Usually, however, when biology turns up in critical accounts of modernism, it is limited to nineteenth-century backgrounds. The 2003 *Concise Companion to Modernism* offers a case in point. Angelique Richardson contributes a chapter on "The Life Sciences" that provides a useful grounding in Victorian science and its major upheavals.⁶¹ Charles Darwin, Thomas H. Huxley, Francis Galton—all the major figures are there, as are the major issues, from evolution to degeneration to eugenics. The latest primary text Richardson cites, however, is from 1912, and most are much earlier. A definitive account of the intersections between twentieth-century zoology and literature has yet to be written.

But scientific ways of viewing animals proved generative for literary modernism in the works of Woolf, Wells, and Lawrence, as well as Marianne Moore, Elizabeth Bishop, and others. This is not to suggest that their animal aesthetics were identical to scientific forms of representation; in many cases, most notably that of Lawrence, writers constructed their animal

⁶⁰ See Donald J. Childs's *Modernism and Eugenics* and Susan Squier's *Babies in Bottles*; Michael H. Whitworth's *Einstein's Wake*; and Patricia Rae's "Anthropology" and Susan Hegeman's *Patterns for America* for accounts of modernism's relationship to eugenics and reproductive biology, physics, and anthropology, respectively.

⁶¹ Richardson also contributed a chapter, "The Biological Sciences," to the 2006 *Companion to Modernist Literature and Culture*. Although that chapter focuses more on psychology and fin-de-siècle fiction than on institutional biology, my claim still holds: Victorian figures like Darwin, Herbert Spencer, and G.H. Lewes loom large, while twentieth-century figures like Julian Huxley, J.B.S. Haldane, and Arthur Tansley are absent.

representations in a way meant to challenge scientific approaches. In her article on the aquarium at the London Zoo, Woolf clearly distinguishes between the display's meaning for ichthyologists and for poets, and other authors adopt similar distancing moves to distinguish their ideas from those of biologists. Lawrence's *Birds, Beasts and Flowers* is arranged according to a pseudo-taxonomy that mimics, but does not replicate, biological classification (Fig. 2). His categories of "Evangelistic Beasts," "Creatures," "Reptiles," "Birds," and "Animals" echo Linnaean divisions, but differ from them in organizing life according to poetic effects rather than phylogenetic relationships—no biologist would group mosquitoes, fish, and bats together as Lawrence does. Wells's science fiction, meanwhile, borrows the rhetoric of science to create cryptozoological fantasies about hyper-intelligent ants, man-eating cephalopods, and insect-like Martians. The common thread here is that these writers are familiar with zoological approaches to animals, and that they respond creatively to these zoological modes of representation.

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Figure 2

The modernist writers I discuss in this dissertation also recognized, and in many cases took to heart, the philosophical understanding of animals that underpinned modern zoology. As discussed above, Darwin inaugurated an age of biology that assumed, as a starting principle, continuity between humans and other animal species. The new understanding of biological continuity led people to see more ostensibly human qualities in animals, and simultaneously to interrogate their own biological characteristics. When Wells, Lawrence, Woolf, and the *Secrets of Nature* films depict animals as communicative, emotional, and contemplative creatures, we should not dismiss these representations as naïve anthropomorphism or assume that they are

meant as fables of human life. Instead, they reflect an understanding of animal subjectivity that is informed by scientific understandings of biological continuity, and by the new zoological subdisciplines, which studied animals as active, agentive, and mindful creatures.

What is unusual, and peculiarly promising, about zoological modernists' representations of animals is that they contain little pretense of "nature" as a unified, pre-modern entity. Their fascination with animals cannot, then, be fully explained through the discourse of primitivism. Whether it is Woolf writing about urban zoological and botanical gardens, the London intellectual crowd watching animals on film, or Wells envisioning rival animal empires, modernists were not particularly invested in the nature/culture dualism or in cordoning animals off from human technologies, practices, and spaces. Lawrence is something of an exception here, in that his Romantic-inspired modernism does traffic in primitivist ideas about nature. Yet even Lawrence writes about animals in urban and garden spaces and mixes natural and technological imagery, accomplishing what Bruno Latour would call hybridization rather than purification of nature and culture.⁶² Zoological modernism's simultaneous fascination with nonhuman animals and reluctance to draw on the idea of nature makes it especially interesting for ecologically-inclined scholars today, who are beginning to concede that the idea of nature is more a hindrance than a help to ecological ethics and politics. These scholars believe that the idea of nature reifies a non-essential division between humans and the rest of the world, and that we need other ways of thinking about relationality between humans and nonhumans, whether "ecology," "the collective," or "companion species."⁶³ The texts discussed in this dissertation were among the

⁶² Latour, *We Have Never Been Modern*, 10-11.

⁶³ See Timothy Morton's *Ecology Without Nature*, Bruno Latour's *Politics of Nature*, and Donna Haraway's *When Species Meet*, respectively.

first to recognize that animals are not just synecdoches for a nature that is the opposite of modernity, but instead actors in a shared modern world.

The texts of zoological modernism offer us glimpses of the kind of encounters with animals that were characteristic of modern experience—encounters that were not limited to the forests and rivers that signify “wilderness,” but often took place in zoos, gardens, parks, movie theaters, laboratories, houses, and colonial spaces. They also remind us of the close links between literary and scientific culture during the early twentieth century, links often obscured by canonical modernism’s self-proclaimed myth of aesthetic autonomy and science’s reputation as an enterprise that believes in its own objectivity. In these works, attention to animals prompts a self-consciousness about representation and a recognition of language’s partiality. While these characteristics have often been reserved for high modernism, they permeate many different kinds of writing about animals in the early twentieth century. Zoological modernists’ desire to know and represent animals, to capture something of their strangeness on the page or the film stock, leads them—and us—to the revelation that all our modes of knowing and representing are unstable, and yet that our attempts to know and represent animals continue to be aesthetically, scientifically, and sometimes ethically generative.

Chapter Outline

Each of the chapters in this dissertation is loosely organized around a particular branch of zoology: ecology, ethology, natural history, and animal psychology. Two other trajectories can be traced through the chapters. First, there is a movement from the large to the small—from multispecies biotic communities in Chapter One, through single-species communities in Chapter Two, to individual animals and animal minds in Chapters Three and Four. In visual terms, we

move from the totalizing aerial surveys of the ecologists to the world seen through the eyes of a particular animal. And second, the dissertation begins with a disharmony between scientific ecology and literary modernism, and maps increasingly greater affinities between science and literature or art, ending with Virginia Woolf taking up animal psychology as a positive influence on her work. Both literary modernism and modern zoology were heterogeneous formations, and the relationships between writers and zoologists thus reflect a spectrum of possibilities from opposition to accord.

Chapter One, “Invasion Ecology: Wells and Elton,” examines the development of animal ecology through the lens of H.G. Wells’s writing. At the beginning of his career, in the 1890s, Wells invented a subversive literary version of animal ecology that challenged imperial ideology, decentered the human, and undermined narrative authority. But the discipline of scientific ecology that emerged and developed in the early twentieth century did not follow the path Wells laid down in the 1890s. Instead, it became entangled with antithetical values, such as a managerial ethos, an uncritical support of empire, and the bolstering of narrative authority. These traits are especially visible in the work of Charles Elton, Britain’s foremost animal ecologist during the period. Wells was influenced by these developments in scientific ecology, and in the 1920s he abandoned the subversive animal ecology that his earlier works had sketched out and instead embraced the representational strategies and anthropocentric utopianism of Eltonian ecology. These two different visions of ecology provide new insight into some of the reasons why Wells’s literary style changed so much between 1895 and the 1920s. They also show us how many different perceptions of animals and “nature,” from fantasies of symbiotic cooperation to fears of a violent Darwinian struggle, competed in early twentieth-century British culture.

In Chapter Two, I investigate another adversarial relationship between literature and zoology, the relationship between D.H. Lawrence and Julian Huxley. “Romantic Ethologies: Lawrence and Huxley” explores the antagonism and mutual influence between Lawrentian primitivism and Huxleyan scientific rationalism, focusing on their representations of animal behavior. Analyzing Lawrence’s animal poems in *Birds, Beasts and Flowers* and elsewhere alongside Huxley’s ethological writings, I argue that while both writers were keen observers of real animals and wanted to capture their particularities, they could not help perceiving and representing animals through the lenses of their respective ideologies. Reading the two together allows us to see their opposed ideological predispositions more clearly, but it also reveals moments of mutual influence. Lawrence, for all his vitalism and anti-science rhetoric, turns out to be well-versed in biological debates; Huxley, meanwhile, turns out to have more affinities with vitalists than he would ever have admitted. This reading of Lawrence’s writing and Huxley’s ethology reveals a hidden mutual engagement and migration of ideas between the two polarized figures.

Chapter Three identifies not antagonism but affinity between twentieth-century natural history and modernist visual aesthetics. In “Modernist Natural History and the Cinema: *Secrets of Nature*,” I analyze natural history in 1920s and 1930s Britain through the lens of the popular nature film series *Secrets of Nature*. These short films combine education and entertainment, narrating the life history of animals, plants, and microorganisms while presenting viewers with unusual cinematographic images of the species under study. This film series represents the convergence of a natural history aesthetic inherited from the Victorians and a modernist aesthetic predicated on defamiliarization and hypermediacy. The films use techniques including magnification, cinemicroscopy, and high-contrast lighting to transform the insects, flowers, and

microorganisms on screen into uncanny modernist forms, reminiscent of a Paul Klee painting. They also speak to a desire, widespread among modernist commentators on cinema, for an impersonal medium that can showcase the spontaneity and agency of the nonhuman world. It is little wonder, then, that many of the *Secrets* were shown at the Film Society, an elite club frequented by such modernist luminaries as Virginia Woolf, Roger Fry, and George Bernard Shaw, which screened international and art films. A peculiarly modernist version of natural history emerged from this conjunction of familiar zoological and botanical narratives with new cinematic technologies.

My final chapter, “Inhabiting the Animal Mind: Russell, Haldane, Woolf,” discusses how these three Bloomsbury figures borrowed and revised tropes and ideas from animal psychology to rethink the human subject. Animal psychologists attempted to imagine an animal’s perspective of the world, and they envisioned the animal mind as an open vessel receiving and processing sensations from the external world. Bertrand Russell appropriated this idea and applied it to the human mind, conceptualizing a human subject that was more zoomorphic than most people assumed. For Haldane, animal minds provided an entry into revising the scientific subject; if animals’ knowledge was conditioned and limited by their biological senses, reasoned Haldane, the same must be true of humans’ knowledge. Woolf also found an alternative form of subjectivity in the animal mind, one more open to experience and less violently masterful than the liberal humanist subject. Animal psychology thus influenced all three writers, providing them the literary trope of animal perspectives and the opportunity to think their way out of problematic models of subjectivity.

In the coda to this dissertation, “The Zoological Outlook in the Twenty-First Century,” I reflect on the relationship between zoology and literary-theoretical approaches to animals today.

Animal studies scholars rarely attend to science except to acknowledge Darwin, who, in leveling the divide between humans and animals, planted the seeds of their philosophy. This negligence is understandable given that many of these scholars have strong ethical commitments and biologists have not always been at the forefront of treating people ethically, much less nonhuman animals. But opening up the lines of communication between zoologists and animal studies scholars can lead to a more ethical science and a more worldly criticism. A new wave of animal studies and ecocriticism, led by Donna Haraway, Timothy Morton, and Stacy Alaimo, engages with biological science in promising ways. My dissertation, in tracing the diverse interactions between twentieth-century zoology and modernist literature, offers a prehistory of this new wave of animal studies and points to both its dangers and its potential. At its worst, the conjunction between zoology and the humanities can work to naturalize pernicious ideas about human society. But at its best, it can equip us with a better understanding of particular species as we attempt to stake out a zoologically-informed ethical position somewhere between the instrumentalist scientism of an H.G. Wells and the anti-scientific romanticism of a D.H. Lawrence.

The pages that follow fill in the outlines sketched here, showing how zoology and literature collaboratively reshaped ideas about animals in early twentieth-century Britain. Pursuing the paths that Darwin laid down, the writers and scientists that I discuss see animals not as inert specimens, but as living, active creatures. Observing animals and learning about their behaviors, ecological relationships, and mental lives, these figures took a much more expansive view of the study of animals than earlier generations had. They fixed an aesthetic or scientific gaze on animals only to find themselves looking at subjects, fellow creatures with surprising similarities to humans and perplexing differences. Zoological modernists turned again and again

to the animal world, and what they found there shook up their culture's assumptions about science, aesthetics, and the place of humans in a world where we are just one of many species.

CHAPTER I

INVASION ECOLOGY: WELLS AND ELTON

In 1898 British forces in Kenya, under the direction of Lieutenant-Colonel John Henry Patterson, were building a railway from the Indian Ocean to Lake Victoria. But the project took a terrible detour at the Tsavo River, where workers started disappearing. An investigation soon revealed that two man-eating lions were on the loose, and that they had attacked the workers in the night and devoured their flesh. Patterson began a nine-month-long campaign to kill the lions, and in December 1898 finally succeeded in shooting them. Estimates of the lions' death toll vary widely; Patterson claimed there were 135 victims, all Indian and African workers, but more recently scientists doing forensic analysis on the lions' corpses have estimated that they ate 35 people.¹ The question of why these lions began eating people also remains unsettled, but one possible explanation is that an epidemic of rinderpest, introduced by humans into Africa in 1887, decimated the cattle and their wild relatives on which the lions normally preyed, and so the lions had to turn to another food source.² While the devastation to the railway workers is incontestable, the story of the "man-eaters of Tsavo" is riddled with uncertainties.

This incident illustrates the entanglement of ecology, empire, and questions of narrative authority at the turn of the century. Even as the British East Africa Company was remodeling the landscape to suit imperial needs, the indigenous animals were reasserting their claim to this territory. Patterson's likely exaggerated account of how he killed the man-eating lions may have

¹ Bruce Patterson, *The Lions of Tsavo*, 20-25, 27-29; Yeakel et al., 19042.

² Patterson, *The Lions of Tsavo*, 83-87.

struck a nerve with British audiences not only as a timeless tale of man overcoming nature, but also as an allegory of colonial officers suppressing the purportedly primitive and violent colonial subjects, and as a historically and geographically specific account of human-animal encounters in a changing environment. Ecological and political imperialism, or the control of nonhuman species through ecological science and the conquest of other groups of humans through political and military power, went hand in hand during the early twentieth century.³ Writers like H.G. Wells used animal tales as allegories for colonial relations, while ecologists like Charles Elton used metaphors of colonialism to explain animal dispersal. But the events at Tsavo show us that the link between political and ecological imperialism is more than just analogical—it is also homological, in that both emerged out of the same historical causes. Britain needed to assert control over both the indigenous people and the native plants and animals to maintain order in the colonies, a control that manifested itself in narrative as well as political and administrative practices.

This chapter addresses the relationship between scientific ecology and modernism in late nineteenth- and early twentieth-century Britain. To be sure, eighteenth- and nineteenth-century natural history was also connected to empire; naturalists like Darwin, Thomas H. Huxley, and Alfred Russel Wallace all traveled to the tropics to collect specimens in their early careers, and they often applied the same biological frameworks to the animals and indigenous people they encountered.⁴ What is different about the modernist period is that as natural history morphed into

³ In defining ecological imperialism as the practice of controlling and managing, or “conquering,” nonhuman species, I am borrowing and adapting the terms of Donald Worster, who distinguishes in *Nature’s Economy* between “arcadian” and “imperial” attitudes toward nature (29-31).

⁴ The relationship between earlier naturalists and empire has been explored in Jim Endersby’s *Imperial Nature*, Richard Drayton’s *Nature’s Government*, Robert A. Stafford’s *Scientist of*

scientific ecology, it took a much more ambitious, managerial, and relational approach to plants, animals, and microbes in the colonies, rather than merely collecting, classifying, and curating specimens. Proponents of environmentalism today generally associate ecology with an ecocentric, leftist politics, but it is important to recognize that ecology has an imperialistic and anthropocentric history.

Modernism and ecology grew up together—both emerged in Britain in the 1890s, flourished during the 1920s, and became institutionalized in universities during the 1930s and 40s. Yet with few exceptions, ecological concepts and frameworks, such as succession, organic holism, or the interdependence among species, seem curiously absent from high modernist literature. Recent critics have shown that many modernists—Virginia Woolf, Joseph Conrad, D.H. Lawrence—were interested in nature and even in biological science, so why do their works not engage more with ecology? The answer, I believe, is that modernists would have perceived ecology as a belated Victorian science. Its holistic worldview, imperial and managerial ambitions, and claims to authority had little appeal for a group of writers drawn to fragmentation and distrustful of imperial institutions and scientific truth claims. This is not to suggest that modernists engaged in any conscious, unified anti-imperialist project, but rather that writers like Joyce, Conrad, Woolf, Yeats, and Forster expressed antagonism toward the institutions of colonialism even though they did not always interrogate the racist ideologies undergirding British imperialism.⁵ Ecology, entangled with empire and an aesthetic of organic wholeness, stood for many of the things the modernists disliked most about nineteenth-century culture.

Empire, Mary Louise Pratt's *Imperial Eyes*, and *Imperialism and the Natural World*, ed. John M. Mackenzie, to give a few examples.

⁵ For accounts of these writers' critical engagement with empire, see Vincent Cheng's *Joyce, Race, and Empire*; Terry Collits's *Postcolonial Conrad*; Scott Cohen's "The Empire from the

There is a test-case to explore this hypothesis about the antipathy between literary modernism and scientific ecology: H.G. Wells. At the beginning of his career in the 1890s, Wells was arguably a proto-modernist, experimenting with narrative form and voice as he wrote fictions that challenged Victorian ideologies of progress, empire, and human achievement. These fictions dealt with phenomena that would retrospectively be described as ecological, dramatizing animal invasions and highlighting humans' enmeshment in the natural world. Yet Wells did not follow the modernist path his fin de siècle writings seemed to pave. In the twentieth century, he turned away from the aesthetic experimentation of his early work and instead began to write didactic novels, laying out a program for human progress that involved socialist politics, scientific planning, and increasing subjugation of nature. There are surely a number of reasons for this change in Wells's writing, but in this chapter I suggest that one of the most important ones is his growing awareness of scientific ecology. Wells abandoned the proto-modernist ecology that his earlier works had sketched out and adopted instead the authoritative, managerial voice of the scientific ecologist, a voice that attempted to quash modernist doubts by promising that science could bring about progress and perhaps even utopia.

To understand the assumptions, ambitions, and theories of scientific ecology in the early twentieth century I turn to the works of Charles Elton, Britain's foremost animal ecologist and a major source for Wells's co-authored textbook project *The Science of Life*. Educated at Oxford, Elton became interested in fluctuations in animal populations, which he traced to a number of causes including epidemic disease, the vagaries of dispersal and migration, and the dynamics of

Streets: Virginia Woolf, Wembley, and Imperial Monuments"; Edward Said's "Yeats and Decolonization"; and Mohammad Shaheen's *E.M. Forster and the Politics of Imperialism*.

introduced or invasive species in a biotic community.⁶ Elton represents several trends in the “Oxford school” of ecologists (a term I borrow from Peder Anker to refer to Elton, Julian Huxley, the plant ecologist Arthur Tansley, and their associates at Oxford).⁷ First, he had an unromantic view of nature—studying fluctuations in animal populations had convinced him that no mythical “balance” exists in most biotic communities. Second, he took a synthetic approach to other scientific disciplines, and considered it the ecologist’s task to bring together and make sense of the findings of specialists in fields like chemistry, soil science, physiology, and microbiology. Elton himself was quite accomplished at using the data of others in order to weave overarching ecological theories. And third, he believed that ecology should be an applied science, oriented toward making interventions in nature to help industrial and imperial interests. Indeed, his work on fluctuations in the numbers of animals grew out of a project to help fur companies understand why species like lynxes were more prevalent some years than others. Elton’s students, meanwhile, travelled to Britain’s colonies to pursue projects such as modifying the animal communities in African lakes to make them more attractive to European fishermen. In short, Elton and his colleagues wanted to invest the ecologist with different kinds of authority—over other scientists, non-Europeans, nonhuman species, and even narrative itself.

Elton’s work provided a source and an inspiration for Wells’s own late-career brand of ecology, but it also provides a sharp contrast to our understanding of ecology today. Anna Bramwell explains how the word “ecology” has come to stand not just for a branch of science,

⁶ By “biotic community” I mean all living organisms inhabiting a particular area and interacting with each other. I have chosen to use this term instead of “ecosystem” because, first, it refers to only the organic and not the inorganic parts of a particular environment, and second, because the term “ecosystem” was not invented until 1935 and connotes systems approaches to biology, which are not relevant to my argument.

⁷ Anker, *Imperial Ecology*, 76. Interestingly, Anker also includes Wells in this “Oxford school,” even though Wells did not work and study at Oxford, because of his professed interest in “human ecology.”

but for a set of values: “The normative sense of the word has come to mean the belief that severe or drastic change within that [ecological] system, or indeed any change which can damage any specie within it, or that disturbs the system, is seen as wrong.”⁸ The prefix “eco” has come to be attached to a number of different terms—ecocriticism, ecofeminism, ecocentrism—and to signify respect for nonhuman species. But ecology did not have these connotations in the early twentieth century. Instead, scientific ecology was unapologetically anthropocentric, geared toward manipulating animals, plants, and landscapes to serve human needs. Though early twentieth-century ecologists would occasionally call for conservation so that they could have outdoor laboratories to do research, they consistently prioritized human interests over the interests of all other species. And, as Peder Anker demonstrates in *Imperial Ecology*, “human interests” usually translated to “the British Empire’s interests.” Ecology might call to mind a progressive political movement today, but in the 1920s it meant something very different.

This chapter is divided into three parts. First, I examine proto-ecological ideas in H.G. Wells’s fin de siècle journalism and in his stories “The Sea Raiders” (1896), “The Empire of the Ants” (1905), and *The War of the Worlds* (1898). Scientific ecology was not fully established in this period, but Wells depicted scenarios that we would now recognize as ecological, most notably invasions of animal populations. These invasion narratives undermine imperial, human, and narrative authority through both plot and narrative form. Second, I discuss the development of animal ecology in the 1920s and 30s, focusing on Charles Elton. The work of Elton and his associates attempted to restore the faith in scientific authority and human achievement that Wells had challenged twenty years earlier. By assuming an authoritative attitude to nonhuman species, Elton and the Oxford school tried to make themselves indispensable to the colonial

⁸ Bramwell, *Ecology in the 20th Century*, 4.

administration; their imperious attitude toward other branches of science, meanwhile, worked to secure their place in the professional field. Finally, I return to Wells to analyze his post-ecology writing, namely *The Science of Life* (1929-30, co-authored with Julian Huxley and G.P. Wells) and *Men Like Gods* (1923), a utopian novel that envisions humans' total control of nonhuman nature. Wells shared with scientific ecology not just a faith in humans' ability to scientifically manage and reshape the biotic community, but also an aerial perspective that recovered the narrative authority his turn-of-the-century fiction had dismantled.

At the heart of this chapter is a concern with invasive species both literal and metaphorical, from the invading octopi and ants of Wells's science fiction to the British forces occupying the colonies to scientific ecology itself. These "invasions" are rarely accidents, but instead political decisions by conscious actors. Supporters of the British Empire sought to naturalize its colonization of other people through the rhetoric of ecology. Ecologists, meanwhile, took it upon themselves to introduce new species in particular environments and to colonize other fields of science, appropriating the expertise of other specialists in order to build ecological theories. Humans are probably the most invasive of all species, and this chapter offers a narrative of how proto-modernist anxiety about human invasions metamorphosed into a utopian confidence about human scientific achievement.

A Proto-Modernist Ecology: H.G. Wells at the Turn of the Century

In the 1890s and early 1900s, H.G. Wells wrote a number of magazine articles and short stories, as well as the scientific romances for which he is best known (*The Time Machine*, *The War of the Worlds*, and so on). After studying at the Normal School of Science in South Kensington under Thomas H. Huxley, the young Wells was fascinated by the philosophical

consequences of modern biology, especially Darwin's evolutionary theory. His writings of this period relentlessly attack anthropocentrism; as Robert M. Philmus and David Y. Hughes have shown, Wells dwelled at length on humans' lowly evolutionary origins and probable future extinction.⁹ Yet the short stories of the 1895-1905 period reduce humans to their proper place not just on the evolutionary timeline, but also on the ecological map. Before he advocated for a World State, a scientific technocracy, and a eugenics program, Wells dreamed that nature might check scientific hubris and the tables might turn on the British Empire. Overlaying narratives of colonial contact onto stories about species migration and interspecies competition, Wells at the turn of the century invented a version of animal ecology that undermines narrative authority, imperial power, and human mastery over nonhuman species.

This period represents Wells at his most modernist, aesthetically speaking. Wells is generally considered a residual Victorian figure, undeniably modern in content but not modernist in form. Critics have tended to follow Virginia Woolf in relegating him to that category of late-Victorian or Edwardian writers against whom the modernists rebelled.¹⁰ Indeed, Wells distanced himself from literary modernism and the art novel during the teens, declaring "I had rather be called a journalist than an artist" and "I am the absolute antithesis of Mr. James Joyce."¹¹ His

⁹ Philmus and Hughes, *H.G. Wells: Early Writings in Science and Science Fiction*, 148-152.

¹⁰ Woolf, "Mr. Bennett and Mrs. Brown." Woolf's problem with Wells is that he is more interested in futuristic social planning than individual, psychological characters. She writes that if he had seen the elusive Mrs. Brown in a train car, "[s]eizing upon all these symptoms of the unsatisfactory condition of our primary schools with a rapidity to which I can do no justice, Mr. Wells would instantly project upon the window-pane a vision of a better, breezier, jollier, happier, more adventurous and gallant world, where these musty railway carriages and fusty old women do not exist.... There are no Mrs. Browns in Utopia" (*The Virginia Woolf Reader* 202). I quote Woolf at length because her critique seems to apply to his utopian novels, like *A Modern Utopia* (1905) and *Men Like Gods* (1923), rather than to the decidedly more pessimistic (and more artful) fiction of the 1895-1905 period.

¹¹ Quoted in J.R. Hammond, *H.G. Wells and the Modern Novel*, 8, 4. During the 1910s Wells's views on literature crystallized through a debate with Henry James. James argued for artistic

writings after 1905 or 1910 embrace didacticism over literary form; his writings in the 1890s and early 1900s, meanwhile, are often dismissed as lowbrow genre fiction rather than literary fiction. Fredric Jameson, for example, has famously distinguished between the modernism of writers like Joseph Conrad and the imperial adventure literature of Rudyard Kipling, H. Rider Haggard, and Wells, which “is by and large not modernist in any formal sense.”¹²

Yet when we look closely at Wells’s turn-of-the-century fiction, the distinction from Conrad becomes murkier. Many of Wells’s early stories, such as *The Time Machine* and “The Empire of the Ants,” read like only slightly pulpier versions of Conrad novels.¹³ Wells and Conrad share much more than a debt to late-Victorian adventure fiction; they also share formal and stylistic features such as the frame narrative, delayed decoding, and impressionistic prose, and thematic elements such as anxieties about colonialism and degeneration.¹⁴ These elements have led critics such as Darko Suvin and Bernard Bergonzi to advocate for the artistic value of Wells’s scientific romances, and J.R. Hammond, Paul A. Cantor, and Peter Hufnagel to argue

form in the novel, while Wells argued that the novel should be an “instrument of self-examination,” a “parade of morals,” and a “criticism of laws and institutions and of social dogma and ideas” (Edel and Ray, 154). The correspondence and essays through which James and Wells conducted their debate have been collected by Leon Edel and Gordon N. Ray in *Henry James and H.G. Wells*, and the debate has also been discussed by Nicholas Delbanco (*Group Portrait*, 135-179) and J.R. Hammond (*H.G. Wells and the Modern Novel*, 24-41).

¹² Jameson, “Modernism and Imperialism,” 44.

¹³ There is a good deal of scholarship on Wells and Conrad’s friendship and mutual literary influence. See, for example, Hugh Kenner’s *A Sinking Island* (50-53); Karl Frederick’s “Conrad, Wells, and the Two Voices”; Patrick A. McCarthy’s “*Heart of Darkness* and the Early Novels of H.G. Wells”; John Batchelor’s “Conrad and Wells at the End of the Century”; and Linda Dryden’s “H.G. Wells and Joseph Conrad.”

¹⁴ Delayed decoding is a term invented by Ian Watt to describe Conrad’s tendency to present readers with sensory impressions whose meaning can only be “decoded” later; see *Conrad in the Nineteenth Century* (175-176). Paul A. Cantor and Peter Hufnagel discuss Wells’s use of delayed decoding and impressionism in “The Empire of the Future” (46-47, 51). Michael Fried reads Wells as a literary impressionist in “Impressionist Monsters.” J.R. Hammond argues that Wells develops a mythic method in his fiction that “almost rivals Joyce” (*H.G. Wells and the Modern Novel*, 18).

that Wells should be classified as an early modernist.¹⁵ An inspirational figure for Conrad (at least in the 1890s) and an adversarial one for Woolf, Wells cannot be wholly assimilated into the canon of formal literary modernism, but neither can he be excluded from the literary and intellectual circles of British modernist culture. If modernism is a literary and aesthetic response to political, religious, and epistemological crises in the late nineteenth and early twentieth centuries, as Pericles Lewis and others have suggested, there are few texts more representative of this response than Wells's early writings, which stage on many levels the crumbling of authority.¹⁶

In arguing that Wells's early writings undermine imperial power, I do not mean to suggest that he was consciously striking a blow against racism, chauvinism, or Britain's sense of cultural superiority. His subversion was not a radical overturning of established beliefs, and in many ways his writings even reinforced such beliefs. What Howard J. Booth and Nigel Rigby say of modernism—that “colonialist tropes *coexisted* with the ideas and narratives that questioned, and in time helped to end, formal British imperialism” (my emphasis)—is true of Wells as well.¹⁷ Nevertheless, I emphasize the extent to which Wells foments anxieties and questions ideologies of imperial progress because I believe that works like “The Sea Raiders,” “The Empire of the Ants,” and *The War of the Worlds* differ from earlier colonial literature and later ecological writing, which celebrate empire in a much less critical way.¹⁸ In this argument I

¹⁵ Suvin, “Wells as the Turning Point of the SF Tradition,” 32; Bergonzi, *The Early H.G. Wells*, 1-2, 22; Hammond, *H.G. Wells and the Modern Novel*, 3, and *A Preface to H.G. Wells*, 151-163; Cantor and Hufnagel, “The Empire of the Future,” 36.

¹⁶ Lewis, *The Cambridge Introduction to Modernism*, 11-26.

¹⁷ Booth and Rigby, *Modernism and Empire*, 2.

¹⁸ I am thinking here of the imperial romances of writers like R.M. Ballantyne and H. Rider Haggard, which have struck many critics as, in Nicholas Daly's words, “a more or less explicit part of the propaganda of empire, leading a whole generation of schoolboys—but also soldiers, sailors, adventurers, and businessmen—to believe that Britain's colonies promised exciting

am in accord with a number of critics who see Wells's scientific romances as subverting the ideology of empire.¹⁹ What I want to add to this critical discourse is that Wells's subversion of imperialism emerges in conjunction with a proto-modernist vision of ecology. His fiction works in an allegorical register that narrates threats to the British empire and threats to human ecological control in the same breath.

This argument also builds on recent scholarship about the complex relationship between modernism and empire, since I see Wells as a proto-modernist. The relationship between modernism and empire is a growing field of scholarly inquiry. Critics from Fredric Jameson to Paul Stasi have argued that imperialism influenced the aesthetic structures of modernism, from the formal incompleteness and spatial reorganizations of modernist texts to their figurations of historical tradition.²⁰ To say that modernism emerged from the ground of empire, however, is not to say that modernism is always complicit with imperialism. In Stasi's words, modernist forms are "laced with critical potential even as they embody the self-same ideologies they would seek to resist."²¹ Many of the contributors to the volumes *Modernism and Empire* (2000) and *Modernism and Colonialism* (2007) explore modernists' challenges to imperialism while also attending to Western modernisms' enmeshment in imperialist culture.²² Patrick Williams

adventures and limitless wealth for those who were bold enough" ("Colonialism and Popular Literature at the Fin de Siècle" 21).

¹⁹ For a few examples, see Cantor and Hufnagel, Judith Wilt's "The Imperial Mouth," Andrew Libby's "The Aesthetics of Adventure," Rob Latham's "Biotic Invasions," and John Rieder's *Colonialism and the Emergence of Science Fiction*, especially 66-68, 104-110, and 131-135.

²⁰ See Jameson's "Modernism and Imperialism" and Stasi's *Modernism, Imperialism, and the Historical Sense*.

²¹ Stasi, 5.

²² For a few examples of this scholarship, see Helen Carr's "Imagism and Empire," which claims that Imagist poetry, despite the troubling racial politics underlying its primitivism, "registers the weakening, indeed the crumbling" of imperialist ideology (65); Richard Begam and Michael Valdez Moses's "Introduction" to *Modernism and Colonialism*, which claims that modernism "more often than not challenged the prevailing values of English culture, including its most

captures the complex relationship between modernism and empire, writing, “[M]odernists in general have little time for the idea that ‘empire equals progress’, which was so central to imperialism’s ideological self-justification. Nevertheless, the idea of cultural superiority, that ‘the West is the best’, surfaces in very different writers: in Yeats, for example... or in E.M Forster.”²³ In the case of Wells, his formal and stylistic experiments in the 1890s fiction undermine imperial authority even as the stories replicate certain aspects of imperialist discourse, such as racial hierarchy and an implicit equation of colonized people with animals. My reading of Wells also points to an aspect of modernism’s colonialist context that has been little discussed among literary critics, its entanglement with ecological discourse and applied ecology.

During the *fin de siècle*, ecology did not yet exist as a full-fledged science, so Wells could not have written explicitly about it. Nevertheless, he did weigh in on issues that would later fall under the purview of ecology in his journalism and fiction. “Ancient Experiments in Co-operation,” an article published in 1892, argues that cooperation is just as common and important in nature as competition is, citing examples such as social animals, colonial organisms like coral and sponges, and symbiotic associations between species, for instance lichens composed of fungi and algae.²⁴ The article has clear socialist overtones, praising the “division of labor” in siphonophores (marine animals) and the “harmony of disposition and desire” between

powerful institution, the British empire” (6); and Brian May’s “Romancing the Stump: Modernism and Colonialism in Forster’s *A Passage to India*,” which argues against the critical view that Forster—and modernism more largely—projects onto material colonial places an aestheticized Orientalist symbolism. T.S. Eliot seems to be something of an exception in that he has seemed to critics to be more complicit with the ideology of empire than a Conrad, Joyce, or Woolf. Paul Douglass, in “Reading the Wreckage: De-Encrypting Eliot’s Aesthetics of Empire,” and Vincent Sherry, in “T.S. Eliot, Late Empire, and Decadence,” explore Eliot’s elegiac representations of empire in decline.

²³ Williams, “‘Simultaneous Uncontemporaneities’: Theorising Modernism and Empire,” 20.

²⁴ *H.G. Wells: Early Writings in Science and Science Fiction*, 188-190. Subsequent references cited in text as *EW*.

worker and soldier termites while insisting that competition in nature has been “over-accentuated” (*EW* 189, 188). Indeed, Wells goes on to envision, in utopian fashion, a further extension of the cooperative principle in human society, saying, “The village commune of the future will be an organism” (*EW* 191). This argument resonates with twenty-first-century ecocentric thinking, but it is surprising coming from Wells, an avowed Darwinian. In using the word “organism” to describe the future village commune that he believes will evolve from contemporary human societies, Wells echoes Herbert Spencer’s idea of “the social organism” but also presages a certain strand of early ecology, popularized by the American plant ecologist Frederick Clements and his followers and rejected by the Oxford school, which insisted plant communities were more than just aggregations—they *were* super-organisms.²⁵

This talk of harmony, cooperation, and progress in nature might seem a bit too warm and fuzzy for the Wells that wrote such pessimistic fictions as *The Time Machine*, and he seems to have changed his mind by 1895, when he wrote the article “Bio-Optimism” for *Nature*.²⁶ The article is a blistering review of *The Evergreen*, a new little magazine written mostly by Patrick

²⁵ This debate between the organismal ecology of the Clementsian school and the more reductionist, systemic ecology of the Oxford school is perhaps the signature debate of early ecology, and there are several good accounts of it. See Peder Anker’s *Imperial Ecology* (149-156), Donald Worster’s *Nature’s Economy* (212-215, 301-302), Frank Benjamin Golley’s *A History of the Ecosystem Concept in Ecology* (8-34), and Joel B. Hagen’s *An Entangled Bank* (22-32, 79-87).

²⁶ The difference between “Ancient Experiments in Co-operation” and “Bio-Optimism” prompts the question of what happened between 1893 and 1895 to change Wells’s mind. In the interim, Wells had encountered August Weismann’s germ-plasm theory, which posits that traits are inherited via the germ-cell lines, and not other cells in the body (cells that might change during an organism’s lifetime). Robert M. Philmus and David Y. Hughes write that Wells initially resisted Weismann’s theory because he retained a belief in neo-Lamarckism, or the inheritance of acquired traits, but “he had apparently accepted ‘Weismannism’ by early March of 1895,” before the publication of “Bio-Optimism” (*EW* 10). In other words, for Wells to accept Weismann’s theory he had to abandon his belief in Lamarckian evolution. Jay Clayton has suggested that perhaps the difference between the two articles can be attributed to this shift in Wells’s thinking, in which the optimistic striving of neo-Lamarckism gives way to the ruthless contingency of Darwinian natural selection, an explanation I find persuasive.

Geddes, a Scottish biologist and town planner. Wells castigates Geddes and his partner, J. Arthur Thomson, for propagating sentimental, unscientific nonsense:

Of greater concern to the readers of *Nature* than the fact that a successful professor may be an indifferent art editor, is the attempt on the part of two biologists—real responsible biologists—writing for the unscientific public, to represent Biology as having turned upon its own philosophical implications. Mr. Thomson, for instance, tells his readers that “the conception of the Struggle for Existence as Nature’s sole method of progress,” “was to be sure a libel projected upon nature, but it had enough truth in it to be mischievous for a while.” So zoologists honor their greatest! (*EW* 208)

Never mind that Wells himself had extolled cooperation in nature three years earlier, writing that “it is altogether false to find the nexus of life, and its changes, in competition alone” (*EW* 187).

Now he insists, “There is nothing in Symbiosis or in any other group of phenomena to warrant the statement that the representation of all life as a Struggle for Existence is a libel on Nature” (*EW* 208). Wells’s two articles are technically compatible—one may discuss cooperation without denying the existence of competition—but rhetorically they conflict. The bio-pessimism of the later article is more characteristic of Wells’s fin de siècle writing, and aligns in certain ways with the vision of later Oxford ecologists such as Elton, who rejected the idea of a peaceful balance in nature.

In the 1893 article “On Extinction,” Wells reflects on the “tragedy of Extinction” that has befallen so many animal species and that will someday befall humans (*EW* 169). The article exemplifies the allegorical layering of colonial narrative and ecological narrative that characterizes the short stories, but to pro-imperial ends. Wells discusses humans’ ecological impact on other species in terms of Europeans’ impact on Native American populations:

In the fate of the bison extinction has been exceptionally swift and striking. In the ‘forties’ so vast were their multitudes that sometimes, ‘as far as the eye could reach,’ the plains would be covered by a galloping herd. Thousands of hunters, tribes of Indians, lived upon them. And now! It is improbable that one specimen in an altogether wild state survives. [...] Does any suspicion of their dwindling numbers dawn upon them? Do they, like the Red Indian, perceive the end to which they are coming? For most of [the

dwindling species], unlike the Red Indian, there is no alternative of escape by interbreeding with their supplanters. Simply and unconditionally, there is written across their future, plainly for any reader, the one word ‘Death.’ (*EW* 171)

The bison, like countless other species, has fallen victim to anthropogenic ecological change: “new means of transit, geographical discovery, and the consequent ‘swarming’ of the globe by civilized men, has pushed many an animal to the very verge of destruction” (*EW* 170). Wells sees colonialism and ecological change as analogies for one another, comparing the decline of Native American populations to the diminishing of the bison population. But they are, of course, more than just analogies; they are also historically related phenomena. The U.S. government encouraged the destruction of herds of buffalo in order to clear the plains of Native Americans.²⁷ Their simultaneous decimation was no coincidence but instead a deliberate act of ecological and political imperialism.

Wells uses the language of tragedy to describe these patterns of extinction, echoing a well-worn discourse in the nineteenth century that mourned the vanishing of noble Indians while effacing the government-sanctioned violence that oppressed the Native Americans still living. In speaking of “fate” and imminent “Death” written across the faces of the bison—as, presumably, it was once written upon the “Red Indian”—Wells can lament the destruction wrought by white Europeans and Americans without having to do anything about it. Such extinctions, he implies, are an inevitable consequence of the progress of civilization, or perhaps even of evolution itself. The social Darwinist undertones of the article imply that the dwindling of Native American populations might be a natural consequence of the struggle for existence, in which only the strongest and fittest survive. The rhetoric of tragedy, gesturing to fate and nature rather than to political decisions, indicates acceptance of imperial authority rather than subversion of it.

²⁷ Andrew C. Isenberg, *The Destruction of the Bison*, 123-163.

“On Extinction” mentions one important ecological—and often anthropogenic—factor that leads to extinction: being supplanted by an invasive species, whether “swarming” humans or some other animal. “Following the same grim path” as the bison “are the seals, the Greenland whale, many Australian and New Zealand animals and birds ousted by more vigorous imported competitors, the black rat, endless wild birds” (*EW* 171). In the short stories “The Sea Raiders” and “The Empire of the Ants” and the novel *The War of the Worlds*, Wells also draws connections—analogical and homological—between imperial and ecological invasions. Yet these stories have a different effect from “On Extinction.” Rather than expressing resigned acceptance of colonialism and ecological harm, they envision animals biting back against humans and imply that imperial subjects might strike back against the British. Two key differences between the article and the stories account for this more subversive effect. First, the stories are what Stephen Arata has described as “reverse colonization narratives”—they reverse the terms of the traditional colonial narrative by depicting white Europeans as facing invasion and potential violent conquest.²⁸ And second, the stories use journalistic narrators to report their stories at (at least) one remove, a formal element that undercuts narrative authority and raises questions about other kinds of authority.

“The Sea Raiders,” an 1896 Wells story, stages an animal invasion at home in Britain. A little-known species of octopus or squid, *Haploteuthis ferox*, appears off the Devonshire coast and kills several boaters and sea bathers before mysteriously returning to the deeps. The story is

²⁸ Arata, “The Occidental Tourist: *Dracula* and the Anxiety of Reverse Colonization.” Arata writes that “fantasies of reverse colonization,” which include Bram Stoker’s *Dracula*, H. Rider Haggard’s *She*, and Wells’s *The War of the Worlds*, “are more than products of geopolitical fears. They are also responses to cultural guilt” (623). This mixture of fear and guilt informs Wells’s stories as well. Rob Latham, in “Biotic Invasions,” reads *The War of the Worlds* as a reverse colonization fantasy and further argues that such narratives—and their subversive potential—have been foundational for British science fiction.

narrated in a documentary style, combining the accounts of eyewitnesses, reports from other towns, and zoological details about the creatures. The title “The Sea Raiders” compares the carnivorous cephalopods to human pirates, and thus invites an allegorical reading in which human rather than animal others invade Britain. Invasion literature was a recognizable—and extremely popular—genre in Britain during the late nineteenth and early twentieth centuries, and with “The Sea Raiders,” published two years before his classic invasion story *The War of the Worlds*, Wells combines the invasion narrative with zoological fantasy to create a new hybrid genre.²⁹ I would argue that the story, which highlights humans’ vulnerability to the migration and population flux of other species, is about ecology as much as politics.

The narrator of “The Sea Raiders” attempts to report only the facts but cannot help straying into speculation about why these octopi have surfaced to prey on humans. “Possibly it was the stress of a hunger migration that drove it hither out of the deep,” he muses, before interrupting himself; “But it will be, perhaps, better to avoid necessarily inconclusive discussion, and to proceed at once with our narrative.”³⁰ Later, he returns to the subject in spite of himself:

Hunger migration has, I know, been suggested as the force that drove [the octopi] hither; but, for my own part, I prefer to believe the alternative theory of Hemsley. Hemsley holds that a pack or shoal of these creatures may have become enamoured of human flesh by the accident of a foundered ship sinking among them, and have wandered in search of it out of their accustomed zone; first waylaying and following ships, and so coming to our shores in the wake of the Atlantic traffic. But to discuss Hemsley’s cogent and admirably-stated arguments would be out of place here. (CSS 427)

The idea that a hunger migration would lead the octopi to venture to new territories prefigures Elton’s argument, more than thirty years later, that animal populations are constantly in flux, and

²⁹ Invasion stories, according to Stephen Arata, became popular in the 1880s, and reflect Victorian anxieties about competition with other industrial nations such as Germany and France (623-624). Arata argues that reverse colonization narratives differ from invasion narratives in their fascination with the primitive, but I think that Wells’s stories and novels draw on both categories.

³⁰ Wells, *Complete Short Stories*, 419; subsequent references cited in text as CSS.

that what we consider “plagues” are actually a normal part of ecology. Hemsley’s alternative interpretation, that the octopi developed a taste for human flesh, is of course not normal ecology at all, though it resonates with real-life incidents such as the Tsavo lions’ kills. But both interpretations of the *Haploteuthis* invasion place humans squarely in an ecological contact zone where they face better-adapted predators. The story echoes a contention Wells made in the 1891 article “Zoological Retrogression”: “[I]n an age of excessive self-admiration, it would be well for man to remember that his family *was* driven from the waters by fishes, who still—in spite of incidental fish-hooks, seines, and dredges—hold that empire triumphantly against him” (*EW* 167). In “The Sea Raiders,” it is not fish but cephalopods that hold that ocean empire against humans.

Why discussion about the ecological cause of the octopus invasion would be “out of place here” is not altogether clear; the narrator apparently wishes to report the events objectively, but for whom and to what ends we can only speculate. These abortive lines of inquiry in an otherwise seamless narrative call attention to the narrator. Such intrusions are important, because even though the story is presented in a univocal, journalistic voice that would seem to authenticate the fantastic events related, it is, within the fictional world, reconstructed from multiple sources of information: Fison’s eyewitness account, news stories from other locations bordering the Atlantic Ocean, the testimonies of other boaters (“[t]hese people told their story in gesticulated fragments”), and the zoological theories of people like Hemsley (*CSS* 428). The narrator typically elides these sources through passive phrases such as “it would seem that...” and “it is believed” (*CSS* 427, 429). Occasionally, however, he reveals glimpses of the narrative’s production, and thus reminds readers that his authoritative, “just the facts” account actually relies on many potentially untrustworthy testimonies. Michael Valdez Moses identifies this same

technique in Conrad's *Lord Jim*, noting that "our 'final' view of Jim is nevertheless a speculative synthesis, a narrative construction assembled out of multiple, sometimes unreliable, often prejudicial or partial, and frequently contradictory views of the novel's eponymous character."³¹ Moses argues that this narrative technique reflects the unreliable and uneven traffic of information at the peripheries of empire. I would add that for Wells, it also reflects a demystification of journalistic and scientific voices of authority. By unveiling the production of these authoritative voices from unauthoritative fragments, Wells opens a space for his readers to question narrative authority within the story and beyond it.³²

The next story I discuss undermines narrative authority in an even more overt way. "The Empire of the Ants," published in 1905 in the magazine *The Strand*, exports the invasion narrative to the tropics. The story is about a gunboat crew that has been dispatched to the remote Batemo River in Brazil, a fictional tributary of the Amazon, to deal with a plague of ants. These ants are hyper-intelligent, socially organized, and poisonous, and they have already killed several men. When the gunboat reaches the ants' haunts, it encounters another vessel that the ants have commandeered; this boat's entire crew is dead. The gunboat's captain, Gerilleau, orders his lieutenant, da Cunha, to board the ghost ship and investigate. Da Cunha reluctantly follows his orders, is stung by the ants, and dies later that night. Gerilleau decides to fire the boat's gun at the ants, a futile gesture of retaliation, and then turns back, leaving the ants behind. The story is narrated by an unnamed acquaintance of the ship's engineer Holroyd, and ends by reporting that

³¹ Moses, "Disorientalism," 59.

³² This reading of "The Sea Raiders" is at odds with that of J.R. Hammond, who claims that the narrative's documentary style "sets a tone of scientific confirmation which dispels skepticism," and that "it is calculated to lull the reader by its seeming truthfulness" (*H.G. Wells and the Short Story*, 64). I think, rather, that the narrative is designed to elicit doubts and questions in the reader.

the ants are spreading. “By 1920 they will be half-way down the Amazon,” the narrator says, concluding, “I fix 1950 or ’60 at the latest for the discovery of Europe” (CSS 108).

Like *The Time Machine* and *The War of the Worlds*, “The Empire of the Ants” reflects anxieties about European imperialism. Brazil was no longer a Portuguese colony, having won its independence in 1822, but Britain tried to exercise a kind of cultural and economic imperialism over it during the nineteenth century. As Ross G. Forman explains, Victorians considered Britain to be Brazil’s main trading partner, and thus to have a “powerful economic hold on the activities of the region,” which made Brazil a particularly attractive setting for adventure literature.³³ The gunboat’s crew represents an assortment of imperial types: Gerilleau, a Creole whose “conceptions of etiquette and discipline were pure-blooded Portuguese,” da Cunha, the Portuguese lieutenant, and Holroyd, the English engineer (CSS 92). The story, however, by no means endorses pluralistic democracy in this contact zone, but instead racial stratification. Its casual racism is evident from the first page, on which the Europeans speak of a “Sambo” who has brought them news of the ants. Wells also marks Gerilleau as racially other to Holroyd and the English narrator by depicting Gerilleau’s speech in dialect—“Dey come, dey go” (CSS 92). Wells implicitly sets up a racial hierarchy with the English at the top, the Portuguese and Creoles in the middle, and people of African descent at the bottom, reinforcing rather than subverting British racism. Indigenous South Americans are absent altogether from the story. We might read the ants themselves as an allegorical substitute for the missing Indians, as well as an allegorical doubling of European imperial forces.

Despite its problematic racial politics, the story cast doubts on whether European imperialism is effective, sustainable, or even desirable. As the title suggests, the Brazilian ants

³³ Forman, “When Britons Brave Brazil,” 459.

are more than just pests—they are also imperial rivals. The narrator calls them “new competitors for the sovereignty of the globe,” refers to their “conquests,” and speculates about their eventual “discovery” of Europe—a much more loaded and anthropomorphic term than, say, “migration” (CSS 107, 108). Such terms seem to demand an allegorical reading. The ants might represent a metropolitan imperial rival, but equally they might represent colonized people rising up against their oppressors. Charlotte Sleight has offered a reading in the latter vein, contextualizing “Empire of the Ants” within nineteenth- and twentieth-century entomological discourse, which posited analogies between colonized people and dangerous insects.³⁴ As a fable, the story seems to offer a warning to those seeking to control others—such mastery is always vulnerable, even to seemingly tiny opponents. Someday the tables may turn, and the colonizers may find themselves colonized.

The story connects imperialism and proto-ecology on an historical as well as metaphorical level when the narrator discusses the importance of managing nature for governments, colonial and otherwise. Holroyd tells him that the ants “threaten British Guiana, which cannot be much over a trifle of a thousand miles from their present sphere of activity, and that the Colonial Office ought to get to work upon them at once” (CSS 107). The narrator declares, “[T]he Brazilian Government is well advised in offering a prize of five hundred pounds for some effectual method of extirpation” (CSS 107). As I will discuss later in this chapter, British ecologists marketed themselves as useful to governments; their research could help manage pests and protect economically valuable species at home and throughout the empire. Wells recognized that ecological management would be desirable for the British imperial

³⁴ Sleight, “Empire of the Ants: H.G. Wells and Tropical Entomology.” My interpretation is largely in accord with Sleight’s, who also reads the tale as thematizing anxieties about nature’s triumph over man and indigenous people’s triumph over their colonizers, except that she does not address the importance of the story’s narrative architecture.

administration long before he would have had the vocabulary to describe it as “ecological.” But in “The Empire of the Ants” such management is only a fantasy, for the ants prove impossible to control. “What is one to *do*?” despairs Gerilleau repeatedly. The story thus stages imperial ecology as a failed project.

“The Empire of the Ants” is as much science fiction as it is imperial romance, and I want to situate it at a transitional moment in the history of biology. The story registers an understanding of nature that owes much to Darwin, but that also prefigures the concerns of animal ecology. Holroyd, confronted with the “inhuman immensity” of the Amazon rainforest, reflects on the differences between the South American and British fauna (*CSS* 97).

[I]n England he had come to think of the land as man’s. In England it is indeed man’s, the wild things live by sufferance, grow on lease, everywhere the roads, the fences, and absolute security runs. [...] This forest was interminable, it had an air of being invincible, and Man seemed at best an infrequent precarious intruder. One travelled for miles amidst the still, silent struggle of giant trees, of strangulating creepers, of assertive flowers, everywhere the alligator, the turtle, and endless varieties of birds and insects seemed at home, dwelt irreplaceably—but man, man at most held a footing upon resentful clearings, fought weeds, fought beasts and insects for the barest foothold, fell a prey to snake and beast, insect and fever, and was presently carried away. [...] The puma, the jaguar, were more the masters here...

Who were the real masters? (*CSS* 97)

This is a passage that resonates with Darwinian ideas about humans’ insignificance on an evolutionary timescale, but instead of dwelling on evolutionary time Holroyd instead dwells on ecological space. Wells’s resistance to anthropocentrism is on display as his protagonist muses about a landscape that remains impervious to humans’ attempts at management. The echoes of *Heart of Darkness* are unmistakable, of course, and as in that novel, we cannot disentangle the description of the forest from the text’s implicit understanding of the people who live there. But the passage also expresses serious doubts about humans’ ability to stand over nature and control

it. Rather than being ecological managers, in the Amazon humans (especially Europeans) occupy a much more humble place, prey to the predators and parasites that are adapted for jungle life.

If humans are mostly unsuccessful at changing the Amazon ecosystem, the imperial ants prove themselves adept at modifying their habitat to suit their own mysterious ends. When the gunboat reaches Badama, a town that the ants have invaded, the crew notices some architectural peculiarities. “Holroyd thinks,” reports the narrator, “he distinguished curious earthworks running between the nearer houses, that may have been the work of the insect conquerors of those human habitations” (CSS 105). Like beavers and humans, these ants purposefully alter their habitat. The ecological model here is a dynamic one; rather than imagining animals as dependent variables and the habitat as an independent variable, Wells recognizes that animals (and plants) adapt their environment to themselves as well as adapting themselves to their environment. The ants are agents of ecological change, and apparently more powerful ones than the humans. This dynamic understanding of the relationship between animals and their environment will become important for scientific ecology, as it posits continuity between animal and human ecology and perhaps offers some justification for human interventions in biotic communities. It is also important as a counter to the Heideggerian notion that only humans can build their environments and form worlds—as naturalists and ecologists know, many animals manipulate the earth as well.³⁵

“The Empire of the Ants” thus undermines the idea that humans can master nonhuman species or exist outside of the ecological web. We might read the story as displacing anxieties about colonial uprisings rather than representing them. But given its use of imperialist rhetoric to

³⁵ See Louise Westling’s “Merleau-Ponty’s Human-Animality Intertwining and the Animal Question,” which shows how Jakob von Uexküll’s concept of animal worlds, or *Umwelten*, and Maurice Merleau-Ponty’s uptake of Uexküll promote an understanding of animals as world-building creatures who actively modify their environments (169-171).

describe the ants' accomplishments—"empire," "conquest," "discovery," "sovereignty"—and its vision of a threat to the British empire emerging from the heart of the jungle, it is difficult to imagine that the story could have put the minds of English readers at ease about Britain's colonial holdings. I do not think that we need to choose between the literal ecological reading and the allegorical colonial one; instead, the two interpretations reinforce one another. From the perspective of the Colonial Office, the desire to manage the forest feeds into the desire to manage colonial people and vice versa. The story suggests, however, that the British cannot sustain either kind of power. There are two conclusions that we might draw from this. Perhaps readers will be horrified by the threat to the empire imagined in the story, or perhaps they will take pleasure in the irony of it—the colonizers colonized, animals biting back. Judging from his journalism, Wells enjoyed putting humans in their place and pointing out their cosmic insignificance. I suspect, then, that he found this irony a source of writerly pleasure.

There is another reason I tend toward the latter conclusion, and that is the story's narrative frame, which casts doubts on story and storyteller and leaves us without a voice to trust uncritically. The loss of narrative authority mirrors the loss of imperial power and human control over other species, and Wells turns such loss into a source of readerly surprise and pleasure. "The Empire of the Ants" initially seems to be a third-person subjective narration with access to the thoughts of Holroyd, the protagonist. For the first several pages, the narrator seems to be what Gerard Genette would call heterodiegetic—like the familiar third-person narrators of Victorian fiction, he or she is not a part of the story world and does not interact with the characters.³⁶ In the second of the story's four sections, however, a single sentence changes how we perceive the narrator. Speaking of Holroyd, the narrator says, "He has described these ants to

³⁶ Genette, *Narrative Discourse*, 244-245.

me very particularly” (CSS 101). This sentence, isolated on the page in its own paragraph, is impossible to miss and unmistakably jarring. The shift startles us not only because the narrator uses first-person for the first time, but because this is the moment we realize that the narrator is a homodiegetic one, a character within the story world. This is different from the kind of narratorial intrusion we see in, for example, *Middlemarch*, where the narrator uses “I” to make pronouncements about the characters and the story’s meaning, because that narrator remains firmly outside the bounds of the story world. With this story’s narratorial intrusion, what has seemed to be a straightforward tale related by a trustworthy heterodiegetic narrator suddenly becomes anything but straightforward and reliable.

In part 4, which functions as a closing frame for the story, the narrator reveals more about his own role in the narrative. “I heard this story in a fragmentary state from Holroyd not three weeks ago,” he announces (CSS 107). We learn, retrospectively, that the story is much less epistemologically secure than it initially seemed; not only is it second-hand, but it has also been reassembled from Holroyd’s “fragments” (the same word that the narrator of “The Sea Raiders” uses to describe the boaters’ testimonies, and a buzzword for modernist aesthetics). The tale is doubly unreliable, mediated by both Holroyd’s subjective perceptions of events and the narrator’s editorial manipulations. Ian Watt suggests that in Conrad’s *Heart of Darkness*, the frame indicates “Conrad’s retreat from the omniscient author,” a retreat made explicit in Marlow’s “ironic consciousness” that he cannot give a full, objective vision of the truth.³⁷ Conrad’s frame also, as Hugh Kenner points out, speaks to the novel’s critical stance toward imperialism, prompting the question “How unlike are London and the Congo, really?”³⁸ Wells, like Conrad, frequently uses frame stories, and to similar ends. The closing frame in “The

³⁷ Watt, *Conrad in the Nineteenth Century*, 210-211.

³⁸ Kenner, *A Sinking Island*, 53.

Empire of the Ants” allows readers a critical distance from the narrator. Within this critical distance opens a space for readers to disidentify with the narrator and Holroyd, and to wonder how unlike the rapacious ants and the British colonial forces really are. In undermining its own narrative authority, the story makes it possible for readers to doubt the voices of political and ecological imperialism, and perhaps even to see in the conquests of the ants a kind of poetic justice.

I have focused on “The Sea Raiders” and “The Empire of the Ants” because they offer the best examples of how the proto-ecological invasion narrative, the subversion of imperial ideology, and narrative unreliability converge in Wells’s early corpus. But many other of Wells’s works at the turn of the century also engage with some combination of these themes. For example, “The Valley of Spiders” (1903) is another invasion story, a mysterious tale of three unnamed riders who are attacked by giant floating spiders. “Aepyornis Island,” “The Flowering of the Strange Orchid,” and “In the Avu Observatory” (all from 1894) dramatize disturbing encounters with creatures from the tropics—a vengeful extinct bird, a blood-sucking flower, and a vicious bat-like animal, respectively. These stories also feature unreliable or unknowing narrators, reflecting Wells’s interest throughout the period in interrogating fiction’s narrative voices.

These patterns—the proto-ecological invasion narrative, the reverse-colonization plot, and the dismantling of narrative authority—receive their most extended treatment in *The War of the Worlds*, a novel which portrays England under attack by be-tentacled Martians, and covered in the invasive red weed the Martians bring with them. The Earthlings are powerless to stop the Martians, but at the end of the story a much smaller opponent defeats the invaders—an infectious bacteria against which the Martians have no immunity. Like “The Sea Raiders” and “The Empire

of the Ants,” *The War of the Worlds* is narrated as a post-hoc reconstruction of the Martian invasion which draws on numerous sources, including the narrator’s own experience and that of his brother. The novel even thematizes the unreliability of such accounts, as the narrator criticizes “one of the first pamphlets to give a consecutive account of the war” because its illustrations “were no more like the Martians I saw in action than a Dutch doll is like a human being.”³⁹ On one hand, his criticism of the pamphlet lends credence to his own version of events, the implication being that his first-hand observations are empirically valid in a way that the pamphlet’s illustrations are not. On the other hand, in comparing the drawing to a Dutch doll, the narrator inadvertently points to the mediation and unreliability of representation itself, leading readers to wonder if all representations, including the narrator’s, are not more or less sophisticated “Dutch dolls,” demanding a certain amount of readerly skepticism.

Throughout *The War of the Worlds*, the besieged English are consistently troped as animals on the wrong side of the Martians’ imperial ecology. They are “a flock of sheep,” “little frogs hurrying through grass from the advance of a man,” “a disturbed hive of bees,” “ants” against men (*WW* 70, 100, 117, 172). As the invasion proceeds, the narrator finds himself beginning to identify with other animals. Reflecting on his confidence in English victory during the early days of the Martian invasion, he compares himself to “a respectable dodo in the Mauritius” who little suspects the fate that will befall him (*WW* 73). Observing the Martians’ machinery, he relates, “I began... to ask myself for the first time in my life how an iron-clad or a steam-engine would seem to an intelligent lower animal” (*WW* 88). Describing the Martians’ habits of feeding on human blood, he says, “I think that we should remember how repulsive our carnivorous habits would seem to an intelligent rabbit” (*WW* 150). And looking upon the ruins of

³⁹ Wells, *The War of the Worlds*, 148; subsequent references cited in text as *WW*.

the English countryside, he recalls, “I touched upon an emotion beyond the common range of men, yet one that the poor brutes we dominate know only too well. I felt as a rabbit might feel returning to his burrow and suddenly confronted by the work of a dozen busy navvies digging the foundations of a house” (*WW* 164). These animal analogies rhetorically emphasize that under Martian rule the narrator is “no longer a master, but an animal among the animals” (*WW* 165). But the constant comparisons do more than just establish that humans are merely one species among others rather than lords of creation. They also mount an ethical case against the more thoughtless versions of applied ecology which consider only the interests of humans. Feeling himself like a hunted rat, the narrator says, “Surely, if we have learned nothing else, this war has taught us pity—pity for those witless souls that suffer our dominion” (*WW* 169).

In one intriguing passage, Wells suggests that this pity, or sympathy, should extend to human victims of Britain’s imperial expansion. Though his article “On Extinction” had implied that the decimation of American Indians was an accident of evolution, in *The War of the Worlds* he acknowledges Europeans’ role in another of these atrocities of imperialism.

[B]efore we judge of [the Martians] too harshly we must remember what ruthless and utter destruction our own species has wrought, not only upon animals, such as the vanished bison and the dodo, but upon its own inferior races. The Tasmanians, in spite of their human likeness, were entirely swept out of existence in a war of extermination waged by European immigrants, in the space of fifty years. Are we such apostles of mercy as to complain if the Martians warred in the same spirit? (*WW* 52)

Though the ostensible meaning of the passage is to morally excuse the Martians for their violent conquest, one does not have to scratch the surface very far to see a scathing indictment of the British Empire’s own violent and genocidal history.⁴⁰ What the Martians do to the English is no

⁴⁰ That *The War of the Worlds* is a critical allegorization of imperialism is a commonplace in Wells scholarship. See John Rieder’s *Colonialism and the Emergence of Science Fiction* (131-135) and Steven Mollman’s “*The War of the Worlds* in the *Boston Post* and the Rise of American Imperialism: ‘Let Mars Fire’” for two recent takes on this allegorization. While Rieder focuses

more than the English have done to other people. This passage, coming as it does in the first chapter of the novel, sets up an allegorical reading of the novel as a story of British rather than Martian imperialism, asking British readers to identify and sympathize not just with the animal victims of imperial ecology but also with the human victims of the British Empire. Even here, Wells is no paragon of anti-racism; he registers no doubt that the Tasmanians are an “inferior race,” more in the “likeness” of humans than full-fledged human beings themselves. Despite this failure to interrogate British racism, *The War of the Worlds* provides one of the most overt critiques of colonialism in nineteenth-century fiction. The novel crystallizes the anti-imperial feeling, opposition to an unexamined subjugation of other species, and demystification of narrative authority that preoccupied Wells at the fin de siècle.

Managing the Animal Community: Charles Elton in the 1920s and 30s

The subversive version of animal ecology that Wells developed in his fin de siècle fiction shares many of the same concerns as the scientific version of animal ecology that took form in the 1920s under the direction of Charles Elton, but they had different aesthetic effects and political ends. Elton, a student of Julian Huxley’s at Oxford, published the landmark book *Animal Ecology* in 1927, quickly followed by *Animal Ecology and Evolution* (1930) and *The Ecology of Animals* (1933). Elton got a job in 1925 at the Hudson’s Bay Company, a fur-trading business, where he studied fluctuations in the populations of fur-bearing animals like lynxes and snowshoe rabbits.⁴¹ He also became a professor at Oxford, where he established the Bureau of

on the ambivalence of Wells’s attitude toward colonialism in the novel, Mollman shows how the tale took on a very different, pro-imperial meaning in the context of U.S. imperialism.

⁴¹ Anker, 98.

Animal Population in 1932, an organization that collected data on the numbers of animals.⁴² Elton's work in the 1920s and 30s emphasizes, first, an anti-romantic approach to the study of animal ecology; second, the integral role that animal ecologists could play in human economic and political life; and third, the preeminence of ecologists in the scientific community. Donald Worster argues that Elton's ecology is imbued with a "management ethos," while Peder Anker describes the Oxford school of ecology to which Elton belonged as a "Board of Directors" for nature.⁴³ Elton wanted ecology to be a practical, applied science, not a philosophy of nature in harmony or an overturning of the anthropocentrism and Eurocentrism that structured the dominant attitude toward "nature" in twentieth-century Britain.

Ecology was still a young science at this point, anxious to prove itself, and animal ecology even more so. Ernst Haeckel had coined the word "oecologie," meaning the study of how organisms relate to their environment, in 1866. But ecology proper is usually thought to begin in 1895, with the publication of Eugenius Warming's *Oecology of Plants* (first translated into English in 1909). For the first two decades or so of its existence, ecology was a botanical science, focused on plant distribution and succession in plant communities. Arthur Tansley was the foremost British practitioner of this new science; he was the first president of the British Ecological Society and the founding editor of the *Journal of Ecology*, both established in 1913. 1913 also saw the publication of the first major work on animal ecology, Victor Shelford's *Animal Communities in Temperate America*.⁴⁴ Elton's role in the history of ecology was as a synthesizer and theorist; his 1927 book *Animal Ecology* outlines major theoretical concepts like

⁴² See Peter Crowcroft's *Elton's Ecologists* for a history of the Bureau of Animal Population and Elton's role in it.

⁴³ Worster, 314; Anker, 110.

⁴⁴ This history of ecology is adapted from Donald Worster's *Nature's Economy* and Peder Anker's *Imperial Ecology*.

the food chain, the niche, and the pyramid of numbers. Though I will only discuss Elton's work through the 1930s, it is worth noting that he became deeply interested in the problem of invasive species after World War II and, in 1958, published a book called *The Ecology of Invasions* that inaugurated the sub-discipline of invasion ecology.⁴⁵ We can see the seeds of this interest from the beginning of his career.

Elton's ecology shares with Wells's fin de siècle ecology a skepticism about the kind of "bio-optimism" that *The Evergreen* and its ilk promoted. He did not believe that nature existed in a state of harmonious equilibrium, insisting instead that animal communities were always changing. In *The Ecology of Animals*, he characterizes this view as a peculiarly modern one:

Naturalists of the nineteenth century took over without alteration the idea of the balance of life, i.e. constant populations. The earlier religious ideas had included the concept that the world was created in an orderly way, and disturbances in this order were attributed either to the acts of man himself or to the acts of God in punishing man for his presumption in upsetting this order, or perhaps in doing anything new at all. This general concept fitted naturally into the later biological theories of adaptation among animals, since it was supposed (rightly) that animals were closely adapted to their surroundings and (wrongly) that this adaptedness would lead to a state of steady balance between the numbers of different species.⁴⁶

Only with the new ecology could biologists fully appreciate the flux and instability of the animal community around them. Elton implies, in this passage, that modern ecologists did not worry about the moral consequences of affecting nature's balance, since such balance is a myth anyway. No longer did they fear retribution from God for disturbing the natural order; instead, they could focus on the practical consequences of human interventions into ecological communities.

⁴⁵ Mark A. Davis, Ken Thompson, and J. Philip Grime, "Charles S. Elton and the Dissociation of Invasion Ecology from the Rest of Ecology," 2-3.

⁴⁶ *The Ecology of Animals*, 61; subsequent references cited in text as *EoA*.

In a passage that seems to echo and revise Wells's "On Extinction," Elton even argues that anthropogenic extinctions and near-extinctions are no cause for mourning or moral concern.

Invoking the loss of the bison, the passenger pigeon, and the Arctic whales, Elton declares,

It is not much use mourning the loss of these animals, since it was inevitable that many of them would not survive the close settlement of their countries. The American bison could not perform its customary and necessary migrations when railways were built across the continent and when the land was turned into a grain-producing area. Our object is rather to point out that the present numbers of the larger wild animals are mostly much smaller than they used to be...⁴⁷

Elton's words lay bare the message hidden in Wells's essay—that people should just accept imperial expansion and the ecological destruction that accompanies it, because combating them is futile. At the same time, Elton elides the other characters in the story of the bison—the displaced Native Americans—that Wells acknowledges, if only glancingly. Reading the two together, the imperial and anthropocentric logic of each becomes obvious. Elton's passage goes on to argue that "enlightened governments" should be more careful about protecting "important or valuable animals," not for moral but for economic reasons (*AE* 106). The sense of tragedy accompanying Wells's realization, back in the 1890s, that death and extinction were major parts of natural history and human history, seems absent in Elton's writing.

Despite his skepticism about the Victorian belief in a "balance of life," Elton's analogical language reflects continuity with his Victorian predecessors. He describes animal migration in terms that would not be out of place in a Wells novel, as in this example:

[I]n 1727 great hordes of rats belonging to another species, the Brown Rat (*R. norvegicus*), were seen marching westwards into Russia, and swimming across the Volga. This invasion was the prelude to the complete occupation of Europe by brown rats. Furthermore, in most places they have driven out and destroyed the original black rats (which are now found chiefly on ships), and at the same time have adopted habits which do not bring them into such close contact with man as was the case with the black rat. (*AE* 53)

⁴⁷ Elton, *Animal Ecology*, 106; subsequent references cited in text as *AE*.

This invasion story is one with a happy ending for Europeans, because the brown rats do not transmit bubonic plague as the native inhabitants did. Elton's rhetoric, which posits an analogy between human and animal conquests, partially uncovers the imperialist framework that undergirded ecology for much of the twentieth century. To be sure, the equation of animal migrations with colonial encounters was one of the two master tropes of ecology in this period (the other being the equation of animal and plant life with human economics).⁴⁸ Tansley used such metaphors too, and in fact they can be traced all the way back to Darwin, who wrote in *Origin of Species* about species migration using terms like "immigrants," "intruders," and "foreigners."⁴⁹ Elton did not originate this trend, but he is representative of it.

Elton invokes the example of brown rats displacing black rats in order to show that humans are part of the ecological web and that fluctuations in the numbers of other species in that web affect us. All animals, in his schema, are ecological agents, changing their biotic communities and their abiotic environments. Humans "often produce on the animals effects which are usually quite unexpected in their nature," but humans are not the only ones disrupting the mythical balance of nature (*AE* 52). Rabbits, gulls, and grazing animals interrupt the process of ecological succession for the plants in their habitats; rodents that cache seeds affect the composition of forests; earthworms change soil chemistry and the lay of the land itself (*AE* 20-30, 54). Like Wells's imperial ants, which built "curious earthworks" in the soil, animals in Elton's schema play a dynamic role in the workings of ecology. When Elton discusses humans intervening in the biotic community, then, he envisions them doing so not from a position

⁴⁸ Worster's *Nature's Economy* dwells on economic metaphors, while Anker's *Imperial Ecology* discusses colonial metaphors (36, 65-66).

⁴⁹ Anker 36; Darwin, *The Origin of Species*, 82-83.

outside the ecological web, but from their position within it.⁵⁰ Their interventions may be more deliberate and drastic than those of the rabbits and earthworms, but they are not different in kind.

Elton's insistence that "man is only one animal in a large community of other ones" should not lead us to think him a biocentric thinker, sensitive to the intrinsic value of our animal kin. Instead, he advocated an applied ecology that is anthropocentric and managerial to the core. "Ecology," he declared, "is a branch of zoology which is perhaps more able to offer immediate practical help to mankind than any of the others," through pest control, agricultural management, fisheries and game preserves, and the like (*AE* viii). In the past, Elton admits, humans have inadvertently damaged biotic communities by introducing new species (including diseases), destroying habitats, and failing to understand the interdependence of different species (*AE* 54-5; *EoA* 77, 83-4). But a thriving science of ecology could provide answers to these problems and more. It could help game reserves and fisheries maintain higher densities of animals; it could help farmers ward off pests and improve crop yields; it could help fur traders predict population fluctuations in fur-bearing mammals (*EoA* 87, 81, 86). Ecology, in short, could prove itself as a science by making itself useful to industry.

Julian Huxley, Elton's teacher at Oxford and editor of the series that published *Animal Ecology*, expressed excitement about the new science's promise for the imperial government as well as industry. In his introduction to Elton's book, Huxley enthuses:

Ecology is destined to a great future. The more advanced governments of the world, among which, I am happy to say, our own is coming to be reckoned, are waking up to the fact that the future of plant and animal industry, especially in the tropics, depends upon a proper application of scientific knowledge. Tropical Research Stations, like those at Trinidad and Amani; special investigations, like that into the mineral salt requirements of cattle in equatorial Africa; schemes for promoting the free flow of experience and

⁵⁰ In this claim I am in disagreement with Worster, who writes that "for Elton, modern man is distinctly an outsider, not to be confused with the natural economic system and its workings" (297).

knowledge from problem to problem and from one part of the world to another, such as were outlined in the report of the Research Committee of the Imperial Conference—all these and more will be needed if man is to assert his predominance in those regions of the globe whose climate gives such an initial advantage to his cold-blooded rivals, the plant pest and, most of all, the insect. (*AE* xiv)

By “man,” Huxley of course means European man, and especially British man. His optimism provides a stark contrast to Wells’s tone in “The Empire of the Ants.” Whereas Wells envisioned humans reaching the limits of their power to manage the environment in the tropics, Huxley argues that with government support, scientific networking, and successful research, even the empire of insects will fall to humans.⁵¹

Indeed, the discipline of ecology made its mark in the colonies as an extension of the British imperial government. It became a rite of passage for young British ecologists to travel to Africa to establish themselves as scientists, whether by mapping vegetation in Rhodesia, studying fish populations in the central African lakes, or battling the tsetse fly (which carried sleeping sickness).⁵² Peder Anker shows that the rise of ecology in Britain depended upon the needs of the colonial administration. Arthur Tansley, the foremost plant ecologist in early twentieth-century Britain, encouraged his students at Oxford to travel to the colonies because there were more job opportunities there. As Anker writes, the government “needed people with flexible abilities and interdisciplinary knowledge. The most common task for such ecological entrepreneurs throughout the empire was to transform forests to farmland, deserts to grassland,

⁵¹ Interestingly, entomologists were much less sanguine about the possibility of insect management than ecologists were, as Charlotte Sleight demonstrates in *Ant* (87-99).

⁵² Oxford forester Ray Bourne studied Rhodesian vegetation (Anker 82-86). John Phillips, a South African ecologist and graduate of Edinburgh University, studied the tsetse fly (Anker 120-121). Edgar Worthington, a Cambridge graduate and friend of Elton’s, participated in fishery surveys of central African lakes during the 1930s; his team used their ecological research to make recommendations about fisheries management (*The Ecological Century* 5-27).

thus creating environments fit for various colonial interest groups.”⁵³ The interests of the indigenous people and animals proved a much less pressing concern.

Overall, the ecologists of the 1920s and 30s felt (or at least expressed) much less resistance to imperial ecological management than Wells had at the turn of the century. They were confident that ecology would develop the tools and knowledge needed to adjust the biotic community to human needs, and they were eager to make themselves indispensable to the British Empire and thus bolster the legitimacy of their young discipline. Wells’s doubt about the project of controlling nature manifested itself at the level of form in his short stories, and the ecologists’ confidence in that project was also reflected in their ways of representing. Elton and his colleagues preferred an aerial view of nature and of the other biological disciplines. To many cultural critics, aerial perspectives connote a power differential between the position on high and the subjects down below. One may think of Foucault’s theory of panoptic surveillance, or of Michel de Certeau’s description of the totalizing, knowing, god-like view of New York City available from the top of the World Trade Center.⁵⁴ For the ecologists, a view from the top allowed them to take a position of authority over nature, colonial subjects, and even other scientists, since only the ecologist had the ability to synthesize the knowledge of specialists and apply it to problems of economic and political importance.

The aerial perspective that Elton and other ecologists adopted might seem to contradict their belief that humans were a part of the ecological community rather than special beings outside of it, but I want to reiterate that the view and the belief were compatible. As modern biologists, the Oxford ecologists did not believe that God had placed humans above the rest of

⁵³ Anker, 80.

⁵⁴ See Foucault’s *Discipline and Punish* (195-228) for the theory of panoptic vision, and de Certeau’s *The Practice of Everyday Life* (91-93) for his discussion of the differences between the aerial view of the city planner and the invisible everyday practices of city dwellers.

nature, or that humans differed qualitatively from other animals. They were disciples of Darwin and believed that humans' minds and abilities had evolved naturally, rather than being a divine gift. But while humans were not ontologically outside or above the ecological community, that did not mean they should not take charge from within it. If God had not placed humans above nature, this also meant that God was not frowning on humans' attempts to meddle with creation. Thus, ecologists could see humans as ecological beings and, at the same time, blithely reshape the landscape and biotic community to meet human needs. All animals changed the environment, so Elton and company saw no reason why humans shouldn't do so in a purposeful, directed way.

At one level, the ecologists' aerial perspective was quite literal. The development of airplanes allowed scientists to take bird's-eye photographs of landscapes, which they used to study the relationships of different vegetation zones and evaluate the natural resources in the colonies. For example, Ray Bourne, a professor of forestry at Oxford, published the *Aerial Survey in Relation to the Economic Development of the New Countries* in 1928, a survey of the contested border between Britain's colony Rhodesia and the Belgian Congo.⁵⁵ Elton had some access to an airplane in the 1920s, but he also obtained an aerial view of the Arctic landscape around Spitsbergen, Norway (then a territory that both Britain and Norway were trying to claim) in a more old-fashioned way: by climbing a mountain in order to draw aerial maps of the different ecological zones below.⁵⁶ This view from on high erased individual plants, animals, and people, but it showcased ecology's ambitions as a science and its usefulness for the imperial administration. Wells had refused the authoritative position of the omniscient narrator, but ecologists in the 20s were happy to assume the authoritative position of the aerial surveyor.

⁵⁵ Anker, 82-84.

⁵⁶ *Ibid.*, 93, 88.

As Anker shows, ecologists took an aerial view in a more metaphoric sense as well—they attempted to carve a role for themselves within the scientific community at the top of the food chain, by synthesizing others' data. Elton wrote, for example,

Ecological work is to a large extent concerned with the interrelations of all these different systems [chemistry, physiology, psychology], and it must be quite clear that the study of the manner in which environmental factors affect animals lies on the borderline of a great many different subjects, and that the task of the ecologist is to be a sort of liaison officer between these subjects. (*AE* 34)

A “liaison officer” is a generous analogy for the ecologist; elsewhere Elton suggests that the ecologist might be considered “parasitic” upon the taxonomists that he or she depends upon to identify specimens properly, an apropos metaphor (*AE* 164). Figure 3, from *Animal Ecology*, shows how Elton organized different scientific fields of study under the umbrella of ecology, visually rendering them all subordinate to the master discipline that connects them. Similarly, Elton’s publications from his research in Spitsbergen depended heavily on the observations of his specialist colleagues, and his importance in the history of ecology is largely due to his books, which used others’ research to develop theories of animal ecology.⁵⁷ As Anker sums up, “[Elton] would always try to establish an overview when writing about relations between animals and their environments, or between different academic disciplines. For the rest of his life his outlook on nature and academia would essentially be from above.”⁵⁸ To be sure, the ecologists’ aerial view of the biological and geological sciences had scientific merit, and it was not usually ethically problematic, as the ecologists’ managerial view of other species and colonial people often was. But it did establish a professional authority for the ecologists, and it contributed to ecology’s aesthetics of visual totality and narrative authority.

⁵⁷ Ibid., 95.

⁵⁸ Ibid., 97.

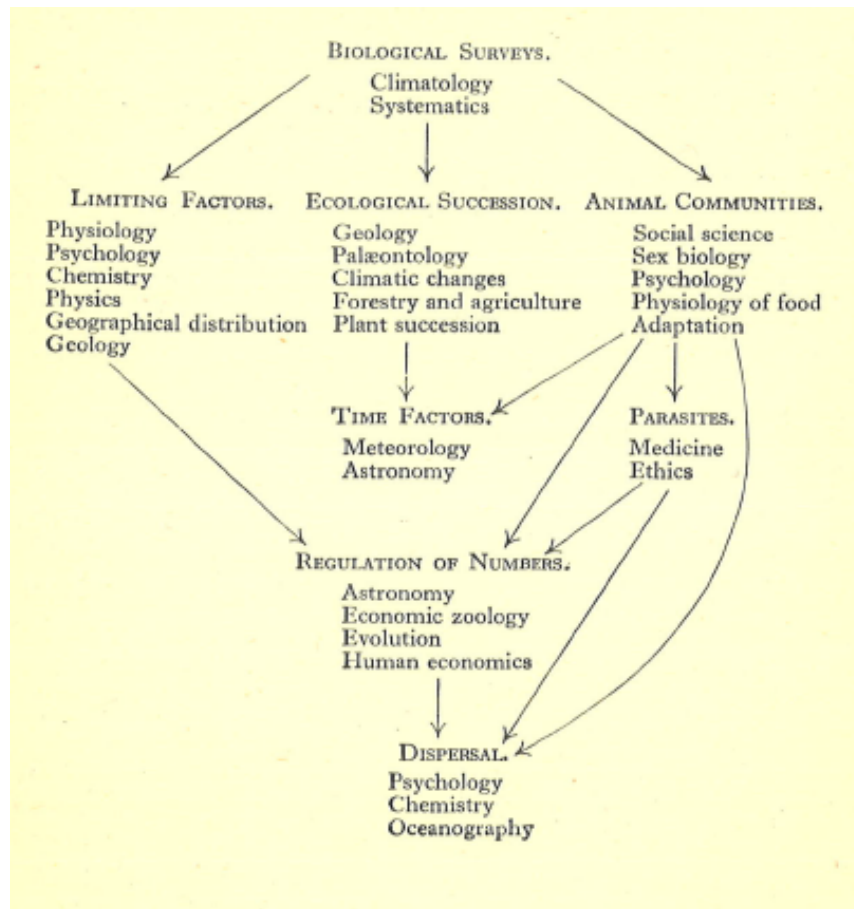


Fig. 3

Elton and the Oxford ecologists seemed confident in their scientific authority, their importance for the British Empire, and their ability to manage nature, and they thus provide a foil to Wells's modernist anxieties. Yet one episode in early animal ecology suggests that beneath this confident authority might lie a narrator as unreliable as any of Wells's. In 1924 Elton published an article, "Periodic Fluctuations in the Numbers of Animals," which assumed that lemmings throw themselves into the sea every few years in a kind of mass suicide migratory ritual. The phenomenon, according to Elton, "is analogous to infanticide among human beings as

a method of preventing overpopulation.”⁵⁹ For Elton, the article was business as usual—consult an account from another biologist, in this case Robert Collett, and use that work to make ecological theories. The problem was that, while the fluctuations in the lemming population were quite real, “[t]he spectacle of processions of lemmings ecstatically throwing themselves over the ends of railway bridges, and falling to an apparently useless death below” was only a tall tale, popular among Norwegian sailors.⁶⁰ Zoologists today believe that lemmings, which can swim, will cross bodies of water in their dispersal and migration, and do occasionally drown, but certainly do not leap to their deaths in massive groups as Elton imagined.⁶¹ Peder Anker writes that Collett’s original work on the lemmings, written in Norwegian, contained “shades of doubt,” but these were lost in translation.⁶²

To be sure, science has long relied on testimony, and scientists must believe in some observations collected by other people in order to make any progress.⁶³ Yet ecology is an especially synthetic science, and the ecologist is reliant on testimony from many different fields

⁵⁹ Elton, “Periodic Fluctuations in the Numbers of Animals,” 126.

⁶⁰ *Ibid.*, 130.

⁶¹ See Riley Woodford, “Lemming Suicide Myth: Disney Film Faked Bogus Behavior,” for a debunking of this belief, which was popularized by a 1958 Disney “documentary” called *White Wilderness*.

⁶² Anker, 97.

⁶³ In *Leviathan and the Air-Pump*, Steven Shapin and Simon Schaffer explain how, during the Scientific Revolution of the seventeenth century, the chemist Robert Boyle helped establish the role of a scientific community in knowledge production: “Members of an intellectual collective had mutually to assure themselves and others that belief in an empirical experience was warranted. Matters of fact were the outcome of the process of having an empirical experience, warranting it to oneself, and assuring others that grounds for their belief were adequate” (25). Initially, this meant multiplying the number of eyewitnesses to an experiment. Bruno Latour, in *Science in Action*, discusses how such empirical experiments in the laboratory become established scientific facts, a process that involves citations and the corraling of allies. This process eventually turns eyewitness claims into “black boxes,” or accepted pieces of scientific knowledge that no longer need to be experimentally verified to be believed (2-3, 59). I think this discussion relevant to Elton and the lemmings because we can understand Elton’s mistake to be accepting as scientific fact a claim that was still contested, and thus failing to empirically verify it.

in which he or she is not an expert; thus, the problem of how to evaluate knowledge that others provide is exacerbated. Positioning oneself at the top, professionally or otherwise, can give the ecologist access to power, but such authority can be peculiarly vulnerable to instabilities below. This story of Elton's mistranslation, misunderstanding, and overreliance on the testimony of others parallels what happens in Wells's early stories, with their frames, editorial narrators, and unreliable witnesses. The difference is that while Wells, at least at the turn of the century, understood and exploited the unreliability of perception, representation, and mediation, Elton seems to have cheerfully ignored these problems. If scientific ecology can be said to have an aesthetic—and I think it can—it was one not of self-conscious partiality and mediation, but of authoritative narrative control and holistic vision.

Engineering Utopian Environments: Wells After Ecology

In 1896 and 1905 Wells had written stories about the quixotic project of ecological imperialism, warning that humans might not be able to subjugate the Atlantic Ocean or the Brazilian rainforest and their animal inhabitants. By 1923, however, with the publication of *Men Like Gods*, he was much more optimistic about the future of ecological management. It is difficult to pinpoint what caused the change. Perhaps it was something in the air, as the apocalyptic mood of the fin de siècle and the World War I years gave way to the sunnier Jazz Age. Perhaps it was a byproduct of his changing literary allegiances, as he turned against Henry James and the aesthetic values of his earlier years in favor of a more didactic, propagandistic kind of writing. Perhaps, as he learned more about the emerging discipline of ecology, he began to have faith in its capacity to change the world. It is not clear exactly when Wells first encountered scientific ecology—the first uses of the term I have been able to find in his work

occur in *The Science of Life* (1929-30), and by his 1934 *Experiment in Autobiography* he was using the term “human ecology” to describe his scientific approach to history and social planning.⁶⁴ But a writer as networked and as engaged with contemporary science as Wells was may have encountered scientific ecology as early as the teens. Whatever constellation of factors influenced Wells’s change of heart, it is clear that by the 1920s and 30s he had come to believe that humans could, and should, mold the environment and biotic community to fit the needs of a progressive society.

The Science of Life, a multivolume textbook that Wells co-authored with his son G.P. Wells and Julian Huxley, devotes two chapters to ecology, the first to the science and the second to its applications. Wells was in charge of the textbook project, but Huxley did most of the writing and probably drafted the ecology sections. Nevertheless, Wells edited and endorsed it, and we may consider it representative of his views on ecology. There are, to be sure, shades of the fin de siècle Wells’s sense of foreboding about the ecological future—one section concludes, “It remains to be seen whether man, with his deliberate aim at a higher efficiency [in using natural resources], his replacement of the hitherto dominant tree by his own cultivations and devices, will make a mess of things and fail, or will succeed and hold on from climax to climax. If he fails the forest will return.”⁶⁵ The threat of the forest overtaking cultivated lands echoes the inhuman jungle of “The Empire of the Ants,” which resisted human encroachment. The dominant tone of *The Science of Life*, however, is a guarded optimism about the prospects of “Life Under Control” (the title of the chapter on applied ecology). If the authors recognize the

⁶⁴ Wells, *Experiment in Autobiography*, 552, 617.

⁶⁵ Wells, Huxley, and Wells, *The Science of Life*, vol. 3, 989; subsequent references cited in text as *SoL*.

fallibility of humans, they also believe in the power of biology to transcend these shortcomings, to make man a better species and the world a better environment for him.

Like the ecological writings of Elton, Tansley, and others, *The Science of Life* draws on metaphors of colonialism that often seem a bit more than merely illustrative metaphors. The authors describe the repopulation of the volcanic island Krakatoa, after its 1883 eruption destroyed all life, in terms of triumphant colonization:

The lowest type of plants, wind-borne as minute germs, were needed to prepare the island soil, save round the level shores. This first primitive community paved the way for mosses and ferns. Each new addition helped to stabilize the soil and made it easier for higher plants to germinate; and so herbs and grasses, shrubs, and finally trees, came in in their due order. It would be difficult to find a more striking example of long-range colonization and slow successional development. (*SoL* 974-975)

The authors narrate a story of ecological progress, in which primitive plants and animals do their part to prepare the ground for more advanced species, a teleological succession leading to the rich and complex climax community. Whether on the denuded Krakatoa or any other empty rock, the story of colonization and succession is always plotted the same way: “Life-communities develop; they develop from slight beginnings, and become progressively richer because each set of invaders paves the way for another, which grow more richly because they made greater demands on the soil. And however they begin, they tend in any one region towards the same stable climax” (*SoL* 979). The teleological progress of ecological succession is not inevitable—it may be interrupted by natural disasters, human development, or grazing animals—but it is a relentless process. Little wonder, then, that Wells would have seen in ecological discourse a progressive vision of the future.

Indeed, the temporality and teleology of ecological succession may have replaced that of evolution in Wells’s thinking sometime between the fin de siècle and the 1920s. Darwinian evolution is not a teleological process—nature has no end game in mind—and it is not

necessarily a progressive one either. Wells wrote his earlier short stories in a climate of fears about downward evolution, or degeneration, and his 1891 essay “Zoological Retrogression” shows that he was well aware of the degenerative possibilities in species evolution. By the 20s, however, succession was the most-theorized concept in plant ecology, and most ecologists considered it both teleological, in the sense that a climax formation is predetermined for a particular climatic environment, and progressive, in the sense that the climax formation is more complex and includes “higher” plant species than the pioneer formation in the same location. Ecology could satisfy the lingering Victorian desire for predictable advancement in a way that evolution (or at least, evolution properly understood) could not.

Wells, Huxley, and G.P. Wells discuss applied ecology in *The Science of Life* in ways that echo Wells’s utopian fiction—they diagnose contemporary problems with humans’ ecological interventions, but dream of a future in which greater knowledge and authority allow scientists to overcome these problems. The authors warn about the dangers of over-hunting, over-fishing, soil exhaustion, and the introduction of new species, citing ample evidence from past ecological crises. “The recklessness of the nineteenth century was appalling,” they declare (*SoL* 1030). Yet if all is not rosy in modern-day environments, scientific ecology can help to repair the mistakes of the past and reshape nature to humans’ benefit: “What before was achieved by slow shiftings of balance due to unconscious competition is now being forced on nature at the point of human consciousness. And man is envisaging new methods of dealing with the old problems” (*SoL* 1027). The authors’ language betrays the violence and force of this ecological engineering, but without regret; as they explain in the next paragraph, nature has always been wasteful of life, and human interventions can mitigate such waste.

Much of this ecological engineering involves manipulating insects and parasites to control invasive species, especially in the colonies.

To help in this work of biological control, special laboratories have been established in many countries. Perhaps the most remarkable is one near London attached to the Imperial Bureau of Entomology. In this ‘Parasite Zoo,’ biologists work out the methods of rearing all manner of insect parasites, and ship them in bulk to all parts of the British Empire as they are required. (*SoL* 1021)

The authors offer several examples of cases in which biologists imported parasites to control introduced species: the “Gipsy Moth” that threatened to overtake North America, the coconut moth that destroyed many coconut palm plantations in Fiji, and the prickly-pear that marched across Australia were all managed by introducing parasites to halt their population explosions (*SoL* 1018-1020). Parasites thus became a natural resource for the ecologist and the Empire: “the bringing in of the products of one region of the globe to supply the natural deficiencies of another is an obvious way in which man may improve upon nature” (*SoL* 1017). And improving upon nature is, the authors assume, the primary purpose of ecological study.

Wells addressed ecological issues in his late-career fiction as well as his nonfiction, including *Men Like Gods*. This 1923 utopian novel places its protagonist, a disillusioned liberal journalist named Mr. Barnstaple, in an alternative universe whose inhabitants have progressed beyond the Earthlings socially, politically, and intellectually. (But not biologically—these people are supposed to be about 3000 years ahead of the Earthlings, which Wells notes is a time frame of social rather than biological evolution.) While driving along a country road, several people cross through a mysterious portal and find themselves in a parallel universe. Mr. Barnstaple is convinced that he has found Utopia, but his fellow Earthlings resent the new world they have discovered and plot to conquer it. Siding with the Utopians, Mr. Barnstaple foils the Earthlings’ plans, and then returns to Earth determined to bring about a utopian revolution. Yet a plot

summary is almost beside the point, for the bulk of the book is devoted not to narrative, but to exposition of the Utopians' way of life. Utopia has no central government, religion, or class divisions; everyone receives an education and performs work; and scientific research flourishes. Wells's socialist values and dislike of religion are on full display, and the novel perfectly encapsulates his turn away from aesthetics and toward didacticism.⁶⁶

Men Like Gods offers a vision of deft ecological management that was recognized by at least one reader in the 1920s, Julian Huxley. In "Biology in Utopia," a review of the novel, Huxley praised its scientific literacy and ecological imagination:

Mr. Wells also imagines a purging of the organic world. The triumphs of parasitology and the rise of ecology have set him thinking; and he believes that, given real knowledge of the life-histories and interrelations of organisms, man could successfully proceed to wholesale elimination of a multitude of noxious bacteria, parasitic worms, insects, and carnivores. Here again we have no right to quarrel. Mr. Wells does not need to be reminded of the thistle in California or the rabbits in Australia: his Utopians proceed with exemplary precautions. All this is but an extension of what has already been begun.⁶⁷

Huxley refers to the thistle and the rabbits as examples of invasive species that have become pests, a possibility that Wells and the Utopians have already considered and taken precautions against. Ecological management as a "purging" and "elimination" of species seems, to Huxley, entirely consonant with the ethos and practice of scientific ecology in his own time.

The Utopians have transformed nature into a garden. Mr. Barnstaple finds himself in "a world where ill-bred weeds, it seemed, had ceased to thrust and fight amidst the flowers, and

⁶⁶ Straightforward readings of *Men Like Gods* such as mine have been challenged by J.R. Hammond, who argues that the novel is an ironic parody about the impossibility of realizing the conditions of utopia. Hammond bases this argument on the ambiguity of Mr. Barnstaple's trip to Utopia; while it is presented as a real one, much of the novel's language suggests that it is a dream Mr. Barnstaple experiences while under anesthesia (see *A Preface to H.G. Wells* 167-172 and *H.G. Wells and the Modern Novel* 126-143). While Hammond's explication of the dream-logic of Utopia is convincing, I do not think this negates the force of utopian politics in the novel; in other words, I think the representations of Utopia can be both Mr. Barnstaple's fanciful dream and Wells's serious blueprint for social progress.

⁶⁷ Huxley, *Essays in Popular Science*, 68.

where leopards void of feline malice looked out with friendly eyes upon the passer-by.”⁶⁸ There are no man-eating lions or leopards here; the Utopians, it transpires, have undertaken a project to reshape nature, involving the “systematic extermination of tiresome and mischievous species,” the selective breeding of other species for human-friendly traits, and the careful cultivation of useful plants (*MLG* 91-94). (Readers who recall the Leopard-Man’s reversion to beastliness in *The Island of Doctor Moreau* will notice that where Moreau failed to quash the leopard’s violent instincts, the Utopians have succeeded, using Darwinian artificial selection rather than vivisection.) The aesthete Freddy Mush, one of Mr. Barnstaple’s Earthling companions, objects to this meddling with “the Balance of Nature,” which has mostly done away with charming species like swallows along with nasty species like gnats. But the Utopians quickly set him straight, relating that they use their extensive ecological knowledge to determine the consequences of wiping out a species before making the final decision, and that they keep a reserve of every condemned species in case its extinction has unforeseen consequences (*MLG* 92). Furthermore, they seem sympathetic to Freddy Mush’s nature-based aestheticism, revealing that they maintain a few garden spaces where lovely but insectivorous birds like swallows and fly-catchers can find enough food to survive (*MLG* 93). In sum, the Utopians exercise the kind of cautious, knowledgeable, and anthropocentric ecological management that Wells and his co-authors call for in *The Science of Life*.

Like Elton, the Utopians do not believe in, much less make a religion of, the balance of nature. “What this Balance of Nature of [Freddy Mush’s] was, and how it worked on Earth, neither the Utopians nor Mr. Barnstaple were able to understand very clearly,” Wells writes mockingly (*MLG* 91). Instead, they believe that nature has always been cruel and wasteful.

⁶⁸ Wells, *Men Like Gods* 34; subsequent references cited in text as *MLG*.

“There must be good in [Mother Nature] because she made all that is good in us—but also there is endless evil. Do not you Earthlings see the dirt of her, the cruelty, the insane indignity of much of her work?” they demand (*MLG* 107). This pragmatic, unromantic view is one they share with Wells and the major Oxford ecologists, and they use it to justify their interventions into nature. Their philosophy of modifying nature, intended to reduce suffering for people and other animals, takes on a moral or even messianic tone, as they declare, “With Man came Logos, the Word and the Will into our universe, to watch it and fear it, to learn it and cease to fear it, to know it and comprehend it and master it. So that we of Utopia are no longer the beaten and starved children of Nature, but her free and adolescent sons” (*MLG* 107). If Elton and Tansley were interested in the material benefits of ecological management, Wells here elevates such management to an almost-divine mission, restoring a sense of religious urgency to the project of subjugating nature, minus the religion.

Men Like Gods shares another trope with contemporary ecology: the aerial view. The Utopians use “aeroplanes” to transport the Earthlings about, and Mr. Barnstaple learns much about this new country from gazing out of the plane window. For example, there are no major cities in Utopia; only “garden pasture with grazing creamy cattle and patches of brilliantly coloured vegetation,” “broad stretches of golden corn-land,” “chestnut woods and at last pines” as the airplane approaches the mountains (*MLG* 39). Though he sees people and signs of habitation, “the effect of the whole was of an extremely underpopulated land” (*MLG* 39). The aerial view offers Mr. Barnstaple a sense of the different kinds of ecological communities in Utopia, from pasture to wood to mountainside. It also allows him to size up Utopia’s natural resources, much as the imperial ecologists sized up the natural resources of southern Africa or Spitsbergen. The Utopians’ deft command of aircraft seems only fitting for a group of people

who have so masterfully seized control of the landscape and the biotic community—of course they would look at nature from on high.

Yet Wells is careful to remind us that the Utopians are biological animals too, albeit special animals, and that managing ecology does not mean transcending it. The Utopians face a frightening reminder of their biological natures when sickness begins to spread among those who have had contact with the Earthlings. They soon realize that the Earthlings have brought with them another set of invasive species—germs to which the Utopians have no resistance. Long ago in Utopia, “[n]early all the insect disease carriers had been exterminated, and rats and mice and the untidier sorts of small bird had passed out of the problem of sanitation” (*MLG* 165). This new invasion of “latent measles” and “a long suppressed influenza” into the world of Utopia poses a serious threat, and may remind readers of the bacterial infection that defeated the Martians in *War of the Worlds* (*MLG* 165). But in *Men Like Gods*, the Utopians rise to the challenge. By quarantining the Earthlings and the sick Utopians, they are able to contain the spread of illness and prevent a pandemic.⁶⁹ Scientific management trumps the ecological processes of infection and dispersal, and the whole episode serves as evidence for Wells’s overarching thesis about man’s simultaneous enmeshment in and power over biology.

In *Men Like Gods*, then, Utopians successfully colonize nature and resist the invasions of other species, whether Earthlings or their germs. It is worth noting that while this novel reverses the implicit critique of anthropocentrism in Wells’s earlier fiction, it doubles down on the earlier works’ critique of imperialism. In fact, Wells openly disparages twentieth-century

⁶⁹ I suspect that Wells may be alluding, not just to *The War of the Worlds*, but also to the 1918 influenza pandemic in this episode. The novel may be working through the trauma and death of 1918 by envisioning a way for science to prevent such pandemics in the future. I have discussed the literary response to the 1918 pandemic and influenza research elsewhere; see “Of Bodies, Families, and Communities: Refiguring the 1918 Influenza Pandemic.”

imperialism and nationalism, envisioning instead a globally united political system. Through the voice of Mr. Barnstaple, Wells diagnoses the problem with much of interwar British society: “You are be-Kiplinged. Empire and Anglo-Saxon and boy-scout and sleuth are the stuff in your mind” (*MLG* 219). Elsewhere, Mr. Barnstaple muses that he had always “despised and rejected nationalism and imperialism and all the tawdry loyalties associated with them; the aggressive conqueror, the grabbing financier, the shoving business man, he hated as he hated wasps, rats, hyenas, sharks, fleas, nettles and the like” (*MLG* 205). There is something very clever about this formulation. While the dominant discourse of imperialism equated non-European people with animals in order to justify violent and exploitative ways of controlling them, Wells reverses this connection by associating the colonizer, rather than the colonized, with annoying and parasitic animals. Through this analogy, he makes it seem ideologically consistent for Mr. Barnstaple to hate imperialism and simultaneously embrace the subjugation of nonhuman animals. Imperialists and “wasps, rats, hyenas,” and so on are pests and thus the political and ecological enemies of Mr. Barnstaple’s sort.

Yet this rejection of imperialism is couched in Eurocentric terms, and so while it is more explicit than the subversiveness of “The Sea Raiders” or “The Empire of the Ants,” it is also less radically anti-imperial. Fredric Jameson claims that in the early twentieth century, “the word ‘imperialism’ designates, not the relationship of metropolis to colony, but rather the rivalry of the various imperial and metropolitan nation-states among themselves.”⁷⁰ It seems that Wells, at least, has in mind this earlier meaning of the term—he dislikes imperialism not because it is unjust to colonized people, but because it foments rivalry among European nations. Insofar as the Utopians are coded as culturally European, we can understand the Earthlings’ failed imperial

⁷⁰ Jameson, “Modernism and Imperialism,” 47.

designs on them as metropolitan competition rather than as an encounter with a colonial other. Similarly, Wells stages a jockeying between the French and English Earthlings for control of the new colony of Utopia, a struggle that he and his protagonist disdain—“To Mr. Barnstaple this conflict of patriotic prepossessions seemed like a dog-fight on a sinking ship” (*MLG* 195). The novel’s stated opposition to imperialism seems more a critique of nationalism and international rivalries than a critique of exploitation in the colonies. It is clear, nevertheless, that Wells is more sanguine about ecological conquest and control than he is about their political analogs.

Part of the difference between Wells’s turn-of-the-century fiction and *Men Like Gods* is thematic, and part of it is linguistic and formal. The Utopians no longer speak aloud to one another, but communicate telepathically. This telepathy effaces the contingency and limitations of language, for meanings are transmitted directly from one mind to another. As the Utopian Urthred explains, “When I think to you, the thought, *so far as it finds corresponding ideas and suitable words in your mind*, is reflected in your mind... Very probably the members of your party are hearing what I am saying to you, each with his own individual difference of vocabulary and phrasing” (*MLG* 59). Utopians thus never miscommunicate due to the accidents of language, because their messages are perfectly adapted for the receiver. Nor do they lie—one of the five principles of Utopian society is “Lying is the Blackest Crime” (*MLG* 273). These plot points allow Wells to represent most of the Utopians’ explanations of their society not in dialogue, but through the third-person voice of the heterodiegetic narrator, without the mediation of quotation marks. We are not meant to doubt what the Utopians “say,” any more than we doubt this unobtrusive narrator. They share a reliable, consistent narrative authority which only a deliberately against-the-grain reader could dispute.

The Utopians' telepathic, unmediated form of communication contrasts sharply with Wells' fin de siècle understanding of language. In 1891, he wrote that most people "fancy the words they work with are reliable tools, instruments of steel, while they are rather like a saw or axe of ice when the thermometer fluctuates about zero centigrade" (*EW* 27). Language, he believed, could never perfectly express meaning. And in stories like "The Sea Raiders," "The Empire of the Ants," and *The War of the Worlds*, it is the gap between words and meanings, between what the narrators say and what readers believe, that helps enable the texts to subvert established hierarchies between metropole and colony, human and animal, narrator and reader. *Men Like Gods*, however, attempts to fill this gap, demonstrating Wells's new literary values, which privilege didacticism and unilateral meaning over ambiguity and irony. Once, he had played with the ironic possibilities of language and narrative, deploying them to artistic and ideologically subversive ends. By 1923, however, he dreamed instead of an un-ironic, universal language of truth.

Conclusion: Waste Lands

H.G. Wells's early writings offer us a vision of an aesthetically and philosophically modernist animal ecology. This version of ecology stresses the contingency and unreliability of human knowledge; it questions the wisdom of anthropocentric programs of ecological management; and it interrogates science and literature's use of colonial metaphors and narrative authority. But this modernist ecology did not keep a foothold in the twentieth century. Instead, scientific ecology, and Wells along with it, took a different turn, aligning itself with notions of progress, imperial management, and an instrumental attitude toward other species. The scientific ecology of the early twentieth century shared little in common with literary modernism or with

the ecological political movement of the later twentieth century, which suggests that other organisms and species might have an intrinsic value separate from their use value for humans. Adorno and Horkheimer, noted theorists of modern culture, criticized the Enlightenment drive to subjugate nature, which they argue leads to subjugation of human others; at the same time, they argued, enlightenment mythologizes unjust social relations and makes them appear natural.⁷¹ They would be horrified, but not surprised, by ecology's domination of nature and naturalization of imperialism.

Yet even if we cannot embrace early ecology's ethos of subjugating nonhuman species to human needs, we should not ignore the challenges it poses to ecological ethics today. Scientific ecology in the 1920s and 30s attempted to dispel the myth of the "balance of nature," and it emphasized the extent to which all animals, including humans, necessarily intervene in and make changes to their habitat. In other words, any model of ecology that envisions humans disrupting a static, balanced nature from the outside is unrealistic. As Tansley declared,

We cannot confine ourselves to the so-called "natural" entities and ignore the processes and expressions of vegetation now so abundantly provided us by the activities of man. Such a course is not scientifically sound, because scientific analysis must penetrate beneath the forms of the "natural" entities, and it is not practically useful because ecology must be applied to conditions brought about by human activity.⁷²

The scientific ecologists insist on seeing humans and human activities as part of the biotic community, rejecting a conceptual division between nature and culture. Tansley can hardly be reckoned a posthumanist thinker, but I suspect that his sentiment in this passage, and his denaturalizing use of quotation marks around "natural," would meet with the approval of

⁷¹ Adorno and Horkheimer, *Dialectic of Enlightenment*, 1-2, 21-22. See Alison Stone's "Adorno and the Disenchantment of Nature" for a particularly lucid explanation of this dialectical relationship between the domination of nature and the naturalization of social relations in Adorno's thought.

⁷² Tansley, "The Use and Abuse of Vegetational Concepts and Terms," 304.

contemporary thinkers like Bruno Latour, Donna Haraway, and Timothy Morton.⁷³ Scientific ecology refused to place humans outside nature, and even if we do not find its managerial ideology an acceptable alternative to contemporary environmental ethics, nevertheless we should take to heart its critiques of neo-Romantic ideas about nature.

I have described early ecologists as confident about their own value as scientific synthesizers and right-hand men for industrial and colonial interests. While I believe this characterization is largely accurate, it is worth probing deeper and asking what this confidence conceals. The most immediate answer is that ecologists needed jobs, and to get jobs they had to make a case for themselves as being indispensable to their society. But a more disturbing answer lurks in Wells's *Men Like Gods*, when the Utopians describe the ravages of nature. "Half the species of life in our planet also, half and more than half of all the things alive, were ugly or obnoxious, inane, miserable, wretched, with elaborate diseases, helplessly ill-adjusted to Nature's continually fluctuating conditions, when first we took this old Hag, our Mother, in hand," they explain to the Earthlings (*MLG* 107). If we can look past the misogyny and distaste for "ugly or obnoxious" things in this passage, we will see something else—a horror at the animal suffering that is part of nature. Elton must have seen this suffering when he studied "fluctuations" in the numbers of animals, a euphemistic way of describing the mass deaths that occur regularly in animal populations. Some Victorians had seen it too, recognizing the dark side of natural selection, and Thomas H. Huxley had been moved by it to declare that nature could not be a model for human ethics.⁷⁴ If ecologists wanted to master nature, in at least some cases it

⁷³ See, for example, Latour's *We Have Never Been Modern*, Haraway's *Simians, Cyborgs, and Women*, and Morton's *Ecology Without Nature*, all of which work to dismantle the nature/culture binary.

⁷⁴ Huxley, *Evolution and Ethics; Science and Morals*, 46-86.

reflected a desire not just for more money or more power, but to reduce suffering, a desire that for Wells's Utopians did not stop at humans but encompassed all animals.

Modernist writers looked at their civilization in the aftermath of World War I and saw, in Eliot's words, a "waste land," but ecologists, beneath their bravado about progress in eradicating disease and providing food and other resources, caught glimpses of a waste land in nature itself. This, perhaps more than any other reason, is why I want to put scientific ecology and literary modernism in conversation with each other—because even if they responded in very different ways to the crises of modernity, such as war and epidemic disease, they were nevertheless confronting similar and related problems. While the modernists attempted to represent these crises, the ecologists attempted to solve them through applied science. We should not be too hasty, then, to dismiss the ecologists' interventions as mere self-aggrandizement. These interventions may also be ways of working through a hidden horror at the waste and suffering in the animal world, a horror which if laid bare would be, to borrow Conrad's words, "too dark—too dark altogether...."⁷⁵

⁷⁵ Conrad, *Heart of Darkness*, 93.

CHAPTER II

ROMANTIC ETHOLOGIES: LAWRENCE AND HUXLEY

In 1928, the writer D.H. Lawrence and the biologist Julian Huxley spent several weeks together in neighboring chalets in the Swiss Alps, along with Huxley's brother Aldous and their families. Lawrence, despite his struggle with tuberculosis, was working on several projects at the time, including an edition of his collected poems; Huxley, meanwhile, was working on *The Science of Life*, a multivolume treatise on biology coauthored with H.G. Wells and G.P. Wells. Considering the philosophical differences between Lawrence and Huxley—the former was known for his intuitionist, vitalistic writing, the latter for his scientific rationalism—this social encounter might seem surprising. Indeed, both Aldous and Julian Huxley remembered the heated debates that surfaced that winter, as Lawrence dismissed the evidence-based science on which Huxley had built his career because he didn't *feel* the truth of it in his solar plexus.¹ Given Huxley's role in popularizing science and spreading the gospel of evolutionary theory, and

¹ David Ellis, *D.H. Lawrence: Dying Game, 1922-1930*, 398-401. Aldous Huxley wrote of his friend, "I remember in particular one long and violent argument on evolution, in the reality of which Lawrence always passionately disbelieved. 'But look at the evidence, Lawrence', I insisted, 'look at the evidence'. His answer was characteristic. 'But I don't care about evidence. Evidence doesn't mean anything to me. I don't feel it *here*'. And he pressed his hands on his solar plexus. I abandoned the argument and thereafter never, if I could avoid it, mentioned the hated name of science in his presence" (quoted in Jeff Wallace's *D.H. Lawrence, Science and the Posthuman*, 17). Julian Huxley, for his part, recalled, "Lawrence often exploded with a snort of impotent rage when we talked about scientific matters. Aldous and I discussed evolutionary and physiological ideas, including the possibility of mankind's genetic improvement. This particularly infuriated Lawrence, who believed that more power exercised by 'the dark loins of man,' greater freedom for our instincts and our intuitions, would solve the world's troubles. His anger was specially directed against myself, as a professional scientist. I learnt to disregard his outbursts of fury, but we had many a stormy passage" (*Memories*, 160).

Lawrence's passionate rejection of both, it is hard to imagine how things remained civil during their shared holiday.

This meeting between Huxley and Lawrence warrants a place in intellectual history because they are the two most important thinkers on animals in early twentieth-century Britain. Lawrence writes about nonhuman species more frequently than any other figure in the modernist canon. Many of his poems—especially those in the 1923 volume *Birds, Beasts and Flowers*—deal with individual animals, while many of his novels deal with the animal qualities of humans. Lawrence's animals embody an instinct-driven, non-rational mode of being, and he interpreted their appearances and behaviors intuitively rather than scientifically. Huxley, on the other hand, helped found the field of ethology, or the study of animal behavior. Between 1912 and 1930 he published a series of studies on bird courtship behaviors, and he also wrote several works discussing animal behavior for general audiences. Today Huxley is mostly remembered for his work popularizing evolutionary theory and his role in the synthesis of Darwinian natural selection with Mendelian genetics. But Huxley built his career on these early animal behavior studies, and in the process helped to build a new branch of zoology.

Lawrence and Huxley, then, represent the divide between the “two cultures” that C.P. Snow would decry in 1959. Huxley's empirical, scientific writings seem to have little to say to Lawrence's intuitive, expressionist prose and poetry, and vice versa. Yet reading these two writers together reveals that they asked similar questions about animals and engaged with each other's conclusions. Both Lawrence and Huxley were interested in real animals, and their methodologies for writing about animal behavior both originate in observation. Lawrence learned a great deal about birds, plants, and wildflowers in his youth, and *Birds, Beasts and*

Flowers reflects his observations of animals and plants in Italy, Australia, and New Mexico.²

Huxley's bird-watching provided the data for his courtship research and the inspiration for much of his popular writing. Yet both writers see animals through the field-glasses of ideology.

Lawrence's animal philosophy leads him to praise the animals that best embody his notion of primitive, instinctual consciousness; meanwhile, Huxley's scientific-humanist philosophy biases him toward species that seem moral and progressive. Both writers, despite their desire to accurately capture the "fishness of fish" or the birdness of birds, face constant ideological mediation when observing animals, and placing the two against each other gives us a more precise sense of their respective ideological positions.³ The juxtaposition makes Huxley's scientism and Lawrence's primitivism obvious, but it also reveals a surprising Romantic streak in Huxley's work and a covert zoological influence on Lawrence's.

We learn, from reading Lawrence and Huxley together, that philosophical generalizations about "the animal," in contradistinction to the human, usually fail to account for the variety of animal life and animal behavior across species and individuals. This lesson has become important to animal studies scholars through the work of Derrida, who critiques the philosophical category of "The Animal" and proposes replacing it with a new category, "*l'animot*" (a play on

² John Worthen describes, in *D.H. Lawrence: The Early Years, 1885-1912*, how the young Lawrence spent time in the woods, learned about plant and animal species from his father, and "grew to seem almost uncanny in his empathy with wild things" (105-6). Jessie Chambers, Lawrence's childhood friend, recalls in her memoir that Lawrence "was enthusiastic about a Nature magazine that came out in fortnightly parts," and that "[his] intimacy with nature was a constant revelation" (110). Sandra Gilbert quotes from a letter to Lady Ottoline Morrell in 1915, in which Lawrence describes a bird singing, and writes, "Already a habit of close attention to the non-human had been established, and it had been established in conjunction with a rejection of humanity" (*Acts of Attention*, 122-123). This habit of close attention, she continues, prepared him to write *Birds, Beasts and Flowers*.

³ I borrow the phrase "fishness of fish" from Kenneth Inniss's *D.H. Lawrence's Bestiary*, 14.

the plural *animaux*), that points to the plurality of animals.⁴ The problem with “the animal” becomes evident when we compare Lawrence’s and Huxley’s writings. Some animals practice monogamy and an extended family life, while others do not; some species are social, others solitary; some species are silent, others communicative; some species seem to display recognizable emotions, and others to lack them. Even ideologies, such as those of Lawrence and Huxley, that commend “the animal” for its authentic mode of being or its demonstration of progressive moral values oversimplify the animal world and interfere with our observations of actual animals. It would be impossible, of course, to cast off the ideological lens completely and see animals neutrally. But in tracing the implicit debate between the texts of Lawrence and Huxley, we can get insight into how particular ideas of “the animal” competed within animal representations in the modernist period.

We also learn, from reading Lawrence and Huxley against each other, that while the ideologies guiding their view of animals cannot be cast off, nor are they fixed and unmalleable in form. Lawrence *is* generally a modernist Romantic, a representative of the twentieth-century backlash against scientific rationalism and the new embrace of expressionism, intuition, and vitalism; and Huxley *is* generally a “Victorian thinker,” a representative of the scientific reason and mechanistic thinking that Lawrence despised.⁵ But when we examine their writings more closely, we find that Lawrence is much more informed about modern science than labels like “reactionary” or “anti-rationalist” would indicate. His animal poems draw on and challenge zoological concepts such as biological mechanism, natural and sexual selection, and animal sociality, communication, and play. We also find that Romanticism, in the forms of vitalism,

⁴ Derrida, *The Animal that Therefore I Am*, 40-41.

⁵ Colin Divall, in “From a Victorian to a Modern,” claims that “Huxley was a Victorian thinker fated to live in an unsympathetic modern age,” an opinion common among Huxley scholars (32).

empathy, and the elevation of emotion, has made an imprint on Huxley's work and tempered his scientific-humanist ideology. Their writings point to a traffic in ideas between their respective schools of thought that often goes unnoticed. The "animal" of modernist primitivism looks different from the "animal" of modern biology, but they are related beasts.

To see how Lawrence's and Huxley's ideas about the animal compete and influence each other, this chapter compares their representations of three kinds of animal behavior: social behavior, communication, and play. Huxley's work on animal sociality and communication debunks some of the assumptions behind Lawrence's animal philosophy; meanwhile, Lawrence's writing on animal communication and play sheds light on the roles empathy and emotion play in Huxley's ethological epistemology. Though the authors' ideas about animals are more contradictory than congruent, together they expose the usually invisible assumptions and beliefs that mediate each other's observations and representations of other creatures. Together, Lawrence and Huxley also remind us that antagonism is as important a form of influence as emulation, and show us that both modes of influence characterize the relationship between modernist primitivism and modern science.

Lawrence, Huxley, and Animal Ideologies

Before examining Lawrence and Huxley's representations of animals' social behavior, communication, and play, I want to contextualize my arguments within the current scholarly discourse around each writer. There has been a great deal of recent critical attention to the role of animals and animality in Lawrence's work, and to his relationship with science. Yet these two strands of criticism have rarely intersected. Though I generally agree with the critical consensus about what "the animal" means to Lawrence, I want to complicate this position by showing how

zoological categories inform his idea of “the animal.” Science, in particular ethology (which has not been addressed in studies of Lawrence and science), can help us obtain a more precise understanding of Lawrence’s animals than can the typical conceptual apparatus of Lawrence animal studies criticism, which relies on notions of “the body” and “blood-consciousness.” Huxley, on the other hand, has mostly interested historians of science for his “scientific humanism” and his support of scientific social planning, including eugenics. Huxley has come to stand for a brand of scientific rationalism that would have been anathema to many modernist writers, especially Lawrence. Without discounting the accuracy of this portrait of Huxley, my chapter reveals a different side of the scientist: a writer and researcher whose work was also affected by neo-Romantic, quasi-vitalist leanings.

Lawrence scholars, when attempting to explain his representations of animals and nature in general, typically divide into two camps. One camp argues that in animal-centric works like *Birds, Beasts and Flowers* and *St. Mawr* (a novella centering on a horse) Lawrence registers the otherness of nonhuman life and sees animals not as symbols or anthropomorphic projections but as real and strange beings. This position appears in older Lawrence scholarship from the 1970s, but it is revived by animal studies scholars in the 2000s. These critics tend to take Ursula’s exclamation in *Women in Love*, “How stupid anthropomorphism is!” as an apt expression of Lawrence’s position on how animals should (and should not) be represented.⁶ Most of these critics agree that Lawrence’s animal poems fail when, in Carrie Rohman’s words, he “uses humanity as a poem’s ultimate reference point[;] the poetry usually becomes symbolic and trite.” The poems succeed, however, when “Lawrence resists anthropomorphic symbolism as he

⁶ Lawrence, *Women in Love*, 264.

confronts the alterity of the animal other.”⁷ Scholars in this camp tend to prefer poems like “Snake,” “Fish,” and “Mosquito” to poems like the *Tortoises* sequence or “Bibles” (a poem about Lawrence’s dog) because they perceive the latter as more burdened by symbolism and human psychology, the former as truer to the actual creatures they purport to describe.

Other scholars, influenced by poststructuralism and deconstruction, resist the idea that any of Lawrence’s animal poems, even the ones that are thematically about otherness, escape the charges of symbolism, anthropomorphism, and mediation; in fact, many of them argue, the poems self-consciously reflect on the impossibility of immediacy. Jeff Wallace, for example, reads Lawrence’s representations of animals not as attempts to capture their genuine essences, but as meditations on how anthropomorphism is the inescapable condition governing human perceptions of animals.⁸ According to Ross C. Murfin, the poems of *Birds, Beasts and Flowers* (particularly “Snake”) reveal the impossibility of fresh, unmediated perception of the nonhuman world; the “voices of education” always stand between the poet and his nonhuman subject.⁹ Whether the cause is human education or the human mind itself, these critics agree that Lawrence’s animals are always mediated by symbolism and anthropomorphism.

Critics on both sides of the debate turn to “Snake,” the most anthologized of Lawrence’s poems, as evidence for their claims, because the poem’s complexity seems to accommodate both

⁷ Rohman, *Stalking the Subject*, 91. Other critics who believe that Lawrence’s animal poems (or at least his *good* animal poems) are about encountering otherness rather than cloaking it in symbolism include Sandra Gilbert, in *Acts of Attention*, Helen Sword, in “Lawrence’s Poetry,” and Margot Norris, in *Beasts of the Modern Imagination*. Kenneth Inniss, in *D.H. Lawrence’s Bestiary*, also draws a distinction between those works that try to “express the essential fishness of fish, horseness of horse, rabbitness of rabbit” and works that treat the animal as “emblem or archetype,” although he does not make a value judgment about this difference (14).

⁸ Wallace, *D.H. Lawrence, Science and the Posthuman*, 119-151.

⁹ Murfin, *The Poetry of D.H. Lawrence*, 106-121. Another critic in this camp is Amit Chaudhuri, whose reading of *Birds, Beasts, and Flowers* focuses on the poems’ intertextuality and describes the volume as “an exhibition of stuffed beasts and birds, [Lawrence’s] collection of textual mannequins, his pantomime of nature” (*D.H. Lawrence and ‘Difference’* 60).

viewpoints. “Snake” describes an encounter between the speaker and a snake at his water trough. The speaker feels “honoured” by the snake’s presence, perceiving him as “[l]ike a king in exile.” Yet the “voice of [his] education” insists that the speaker should kill the snake because it is venomous. Overcome by this voice, the speaker throws a log at the snake, but instantly regrets his “pettiness.” The poem is full of mythic symbolism, echoing and revising the story of Eden, and of sexual symbolism, as the speaker describes his horror at seeing the snake “withdrawing into [a] horrid black hole.” Yet the poem also seems to remain firmly grounded in the literal—indeed, it is tagged at the end with “Taormina,” a reference to the place of its composition and presumably to the location of the snake encounter that inspired it, since the speaker notes that he is in Sicily. While deconstruction-minded critics unpack the layers of symbolism and intertextuality in “Snake,” other readers are drawn to the seeming immediacy of the snake, seeing it as, in Sandra Gilbert’s words, a “pure [example] of living otherness.”¹⁰

My own take on Lawrence’s representations of animals, especially in the poetry, is sympathetic to both critical camps, but much closer to the second. While some of these representations (most notably “Fish” and Ursula’s reflection on anthropomorphism in *Women in Love*) express a *desire* to encounter other creatures on their own terms, without the mediating lenses of anthropomorphism and education, the evidence suggests that for Lawrence this desire is not, and perhaps cannot be, fulfilled. I would not go so far as Amit Chaudhuri, who claims that *Birds, Beasts and Flowers* “does not describe animals or beasts at all, but describes their imitations,” but I would maintain that Lawrence’s philosophical assumptions about animals lead

¹⁰ Gilbert, *Acts of Attention*, 164.

him to overlook many of their attributes despite his real observations of and encounters with them.¹¹

What are these assumptions about animals that guided Lawrence's writing? His animal philosophy privileges an *other* way of being that is instinctive rather than intellectual, emotional rather than rational, bodily rather than spiritual, and natural rather than cultural. Sandra Gilbert explains that Lawrence distinguished between two epistemological modes—intellectual knowing, which is detached and often scientific, and intuitive knowing, which is instinctive and empathic. “[I]t is obvious,” she writes, “that he felt a strong personal preference for the intuitional blood-consciousness.”¹² We might surmise from the word “instinctive” that the latter mode is the mode in which animals “know,” and indeed animal studies critics have made this connection between Lawrentian “blood-consciousness” and the animal. Margot Norris and Carrie Rohman take an optimistic view of Lawrence's animal philosophy, the former placing him in a “biocentric tradition” and the latter arguing that his work “recuperat[es] the animal.”¹³ In their view, Lawrence posits animality as an alternative to a mechanized, overly rational, and emotionally stunted modern humanity. Animality, for him, is a way of being that animals naturally enact, but that humans should also strive for.

Norris and Rohman seem to take at face value Lawrence's elevation of animal being over human culture, seeing this anti-humanist gesture as promoting more ethical ways of thinking about and being with animals. I am less convinced of the ethical promise of Lawrence's animal philosophy, though, because it generalizes the concept of “the animal” and thus erases many differences among real animals. Lawrence is constantly writing sentences that *seem* animal-

¹¹ Chaudhuri, *D.H. Lawrence and 'Difference,'* 60.

¹² Gilbert, *Acts of Attention,* 154.

¹³ Norris, *Beasts of the Modern Imagination,* 1, 170; Rohman, *Stalking the Subject,* 100.

positive, sentences that criticize anthropomorphism and express admiration for animals' wordless wisdom. But, as Philip Armstrong has noted, the concept of "the animal" that emerges is an abstraction that often bears little resemblance to actual, particular animals.¹⁴ If Lawrence's writing has anything to offer to animal ethics, it must be found in those moments when he breaks away from this abstraction, not when he champions it.

Lawrence's belief in intuitive knowledge and "blood-consciousness" affected not only his representations of animals, but also his attitude toward science and scientific epistemology. His aversion to science is well-documented, and he reserved particular contempt for evolutionary theory and mechanistic approaches to life. In *Mornings in Mexico* he declares, "I don't believe in evolution, like a long string hooked on to a First Cause, and being slowly twisted in unbroken continuity through the ages."¹⁵ In *The Rainbow*, meanwhile, Ursula revolts against the mechanistic physics professor Dr. Frankstone, who says, "I don't see why we should attribute some special mystery to life—do you?" Ursula, in response, feels more persuaded than ever of her vitalistic beliefs; she "only knew that [life] was not limited mechanical energy, nor mere purpose of self-preservation and self-assertion."¹⁶ Lawrence's hostility to these two pillars of modern biology arises not from religious doctrine but from a secular distrust of science's reductionist, determinist, and mechanizing tendencies.

¹⁴ Armstrong, *What Animals Mean in the Fiction of Modernity*, 149. The problem is related to one that Anne Fernihough identifies in *D.H. Lawrence: Aesthetics and Ideology*. While Lawrence claims to be a materialist and to privilege the body over abstract ideas, he "constantly risks reifying the body into what is merely another transcendental category" (3). In other words, he uses all the right language for materialism—the vocabulary of matter, embodiment, and organicism—but the concept of "blood-consciousness" that emerges is just as transcendental, and ideological, as the idealism he denounces.

¹⁵ Lawrence, *Mornings in Mexico*, 14.

¹⁶ Lawrence, *The Rainbow*, 408-409.

Lawrence's hatred of science was not based in ignorance. On the contrary, he was well-versed in the works of the Victorian scientific sages. In his youth, he read Darwin's *Origin of Species*, Thomas H. Huxley's *Man's Place in Nature*, Herbert Spencer's *First Principles*, and Ernst Haeckel's *Riddle of the Universe*. These works had a great impact upon him and, for a time at least, he seems to have accepted the tenets of evolution.¹⁷ In later years, after establishing his anti-scientific philosophy, he engaged in debates about science with the Huxley brothers, and he also seems to have been familiar with H.G. Wells's evolutionary *Outline of History*, first published in 1919.¹⁸ I would thus agree with Wallace's remark that "Lawrence was in tune with contemporary, post-Darwinian science."¹⁹

Yet most Lawrence critics who have studied his relationship to post-Darwinian science have only addressed one tenet of modern biology—evolution.²⁰ To be sure, evolutionary theory was an important influence on Lawrence, and his simultaneous rejection and revision of it a complex theme in his works. But in the twentieth century, what interested biologists most about evolution was its application in particular fields of study such as heredity, ecology, and ethology. Given Lawrence's familiarity with "contemporary, post-Darwinian science" and his

¹⁷ Roger Ebbatson, *Lawrence and the Nature Tradition*, 32; Wallace, *D.H. Lawrence, Science and the Posthuman*, 16.

¹⁸ Fernihough, *D.H. Lawrence: Aesthetics and Ideology*, 174.

¹⁹ Wallace, *D.H. Lawrence, Science and the Posthuman*, 18. Wallace specifies that the aspect of this science with which Lawrence was most familiar was "its critical interrogation of the human."

²⁰ Ebbatson, in *Lawrence and the Nature Tradition* and *The Evolutionary Self*, and Ronald Granofsky, in *D.H. Lawrence and Survival*, have argued that despite Lawrence's ostensible rejection of evolutionary theory, his novels are saturated with evolutionary ideas and narratives. Ebbatson links Lawrence's work to evolutionary theory's recognition of flux and change where people had once seen stability; Granofsky, meanwhile, reads Lawrence as performing acts of selection on his own characters and concepts. Rick Rylance claims, in "Ideas, Histories, Generations and Beliefs," that Lawrence's relationship to evolutionary materialism was a complex one that cannot be "captured by an 'either-for-it-or-against-it' paradigm" (19). Christopher Heywood's "*Birds, Beasts and Flowers: The Evolutionary Context and Lawrence's African Literary Source*" links the poems to a Haeckelian evolutionary view of life.

acquaintance with one of the founding figures of animal behavior studies, it is worth exploring how his work engages with, and diverges from, contemporary ethological texts like Huxley's.

Ethology offers a new set of terms for understanding Lawrence's animal representations. Many critics use Lawrence's own term, "blood-consciousness," to understand what animality means in his texts. This term connotes bodily knowledge, instinct, and primordiality, all of which do characterize Lawrence's animals. But biologists studying animal behavior used a different set of categories to interpret what they saw. Huxley, for example, wrote about animals' courtship, social behaviors, communication, and play. When we apply these concepts to Lawrence's writing, we see that he usually revised or inverted them, reflecting his distaste for biological explanations.²¹ Zoologists' euphemistic "courtship" becomes unbridled sexual passion; social animals become individualistic monads; functional animal communication becomes inarticulate emotional expression; and adaptive play behaviors become indices of animals' vitalistic spark. These traits point to Lawrence's continuing antagonistic relationship with contemporary biology, and the ethological context makes these traits more visible than the conceptual apparatus of "blood-consciousness" can.

As the most prominent British ethologist in the 1920s, Huxley is an instructive foil for Lawrence. Because Huxley was first and foremost a scientist and Lawrence a poet and novelist, we can assume that clear, unbiased, and accurate representations of particular animals would be more important to Huxley than to Lawrence. Yet even scientists have their own philosophies and ideologies, and Huxley's certainly colored his biological work. Huxley identified himself as a scientific humanist, a position diametrically opposed to Lawrence's neo-Romantic anti-

²¹ My project here is structurally similar to that of Ronald Granofsky, who writes, "Instead of the usual Lawrentian-charged words such as 'blood,' 'spell,' 'darkness,' and 'leadership,' ... my analysis will make use of lesser-noticed terms such as 'fitness,' 'confinement,' 'breeding,' 'eating,' 'illness,' 'garden,' and, especially, 'survival'" (*D.H. Lawrence and Survival*, 7).

humanism. Not content with the proclamation of his grandfather, Thomas H. Huxley, that “the ethical progress of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it,” Julian believed in an intimate connection between biology and human progress.²² Huxley found progress, though not purpose, in evolution; believed that “ethics could be based upon an understanding of evolutionary progress”; and considered humans to have a special place in nature, at the apex of evolution.²³ His interest in human social progress manifested itself in his liberal-moderate politics, his advocacy of eugenics, and his scientific research and writing.

A few historians have explored how Huxley’s political and philosophical beliefs affected his ethological work. Richard W. Burkhardt, Jr. discusses the idea of “the good of the species” as a constant feature of Huxley’s behavior studies. When Huxley observed behaviors that did not seem to promote the good of the species, such as male mallard ducks trampling and drowning female ducks during courtship, he was repulsed by the “disharmony” he had witnessed.²⁴ John R. Durant explains the problem aptly: “As a Darwinist, Huxley was well aware of the fact that natural selection did not necessarily produce biological improvement.... As a humanist, however, Huxley was anxious to show that as a matter of empirical fact selection does bring about the good of the species at least often enough to secure overall improvement in the long term.”²⁵ Mary M. Bartley shows how Huxley’s gender politics dovetailed with his interest in sexually monomorphic bird species (i.e. species in which males and females look alike) that exhibited mutual courtship; he found the monogamy, equality, and cooperative parenting in such species

²² Thomas H. Huxley, *Evolution and Ethics*, 83.

²³ William B. Provine, “Progress in Evolution and Meaning in Life,” 165.

²⁴ Burkhardt, “Huxley and the Rise of Ethology,” 134.

²⁵ Durant, “The Tension at the Heart of Huxley’s Evolutionary Ethology,” 156.

morally admirable.²⁶ Huxley's research cannot be disentangled from his beliefs, and his popular science writing is perhaps even more ideologically saturated.

Huxley does not seem to have exhibited any hostility toward literature in the way that Lawrence expressed hostility toward science. In fact, he wrote poems and short stories himself, won a Newdigate Prize for verse at Oxford, and "seems to have been acutely responsive to poetry," especially that of his great-uncle Matthew Arnold.²⁷ A 1932 *New York Times* article quoted him as saying, "Science can be as exciting and beautiful as anything else, and a fit subject for poetry."²⁸ Huxley also wrote for the *Book Society News* in the 1930s, reviewing books including Rebecca West's *The Thinking Reed*, Ernest Hemingway's *Green Hills of Africa*, and Graham Greene's *A Gun for Sale*. Despite this interest in literature, there are hints that Huxley would have been almost as annoyed by Lawrence's worldview as Lawrence was by his. Writing with H.G. Wells and G.P. Wells that Bergson's *Creative Evolution* "is a brilliant and poetical description... [b]ut it is not a scientific explanation," Huxley betrays a trace of contempt for vague, mystical Bergsonian "poetry" that masquerades as science.²⁹ He also writes that "what [the bird-watcher] is after is *experiences with birds* ... and to satisfy him, they must be experiences objectively and accurately observed, not fantasies spun out of his own head, or emotions which happen to have been touched off by the sight or sound of some bird."³⁰ He might well have been thinking of Lawrence's writing on animals, and the passage's tone is clear: while such "fantasies" are acceptable in certain contexts, good bird-watchers and ornithologists are above that kind of thing. Moreover, while Huxley displays no overt antipathy toward literature or

²⁶ Bartley, "Courtship and Continued Progress," 95.

²⁷ Robert L. Patten, "The British Context of Huxley's Popularization," 258; see also Phillips, "One World, One Faith," 616-617.

²⁸ "Prof. Huxley Here; Talks on His Verse."

²⁹ Wells, Huxley, and Wells, *The Science of Life*, vol. 2, 639.

³⁰ Huxley, *Bird-Watching and Bird Behaviour*, 13.

the humanities, he is strident in his advocacy of evolution and scientific humanism, as titles like “The Incontrovertible Fact of Evolution” (Book Three of *The Science of Life*) and *If I Were Dictator* (1934) show. It is easy to understand how Huxley’s dogmatic style would have alienated other intellectuals in the creative arts.

Most of the existing scholarship on Huxley has emphasized his humanism, his advocacy of scientific social planning, and his belief in human evolutionary progress. Yet Huxley chose to study species other than humans for much of his career, and in his writings on bird-watching and animal behavior, we can detect a countercurrent to this anthropocentrism—he is sensitive to the ways in which other animal species differ from humans and fascinated by the differences as well as the parallels. What we are after, says Huxley, is “*experiences with birds*”—not solipsistic experiences with our ideas about birds. Without minimizing the impact of Huxley’s humanism on all his work, then, this chapter treats what his writing says about animals as equally important to what it says about humans and human society.

This chapter also further explores an aspect of Huxley’s thinking about animals that has already been noticed by Burkhardt, Durant, and Eileen Crist: that Huxley’s mode of understanding other species is not always strictly scientific. Burkhardt has shown that Huxley believed ethologists could make assumptions and inferences about animals’ subjective, conscious experiences—a belief that other leading ethologists would dispute.³¹ (See Chapter Four for a more in-depth discussion of this issue.) Durant writes that Huxley “was willing to exploit his considerable feelings of empathy toward his subjects in order to gain greater insight into both the causes and the consequences of their behavior.”³² And Crist reads Huxley’s bird

³¹ See Burkhardt’s “The founders of ethology and the problem of animal subjective experience” for an account of this debate.

³² Durant, “The Tension at the Heart of Huxley’s Evolutionary Ethology,” 151.

courtship studies as marking a transition between naturalist writing, which portrays animals as mindful and emotional, and classical ethology (i.e. that of Konrad Lorenz and Niko Tinbergen), which portrays them as mechanisms.³³ She identifies his writing as “lyrical,” “replete with human analogies,” and indicative of “an empathic connection between the birds and their human observers.”³⁴ In other words, despite his devotion to scientific epistemology, Huxley often made use of an empathic, intuitive mode of knowing that differs from Lawrence’s more in degree than in kind.

Associated with this empathic, psychological approach to animals is Huxley’s sympathy with a strand of thought I am calling quasi-vitalism. He officially disdained vitalism, the theory that living matter is fundamentally different from inorganic matter in possessing some mysterious vital spark. The theory is an old one, but it had renewed popularity in the early twentieth century thanks to Bergson’s philosophy, which posited an “*élan vital*” as the life force that drives evolution.³⁵ Huxley, like most professional biologists of the time, believed instead in a mechanistic theory of life, in which organic phenomena are reducible to ordinary physiochemical processes. In practice, however, Huxley could not bear to think of animals as “mere machines” or complexes of physiochemical reactions. He wrote in a 1923 essay,

There is a large school to-day who assert that animals are ‘mere machines.’ Machines they may be: it is the qualification that does not fit.... They are mechanisms, because their

³³ Crist, *Images of Animals*, 172-179.

³⁴ *Ibid.*, 172, 179.

³⁵ Peter J. Bowler, in *Reconciling Science and Religion*, offers an account of the debate between neo-vitalists and mechanists in twentieth-century Britain. Bowler explains that new forms of vitalism (holism, organicism, emergence, etc.) were not uncommon even among biologists (166-178). Maëia de Issekutz Wolsky and Alexander A. Wolsky, in “Bergson’s Vitalism in the Light of Modern Biology,” suggest that Bergson’s own form of vitalism is actually much closer to the view of mainstream biologists than other forms of vitalism. Bergson considered the role of the *élan vital* to be allowing for indeterminacy and “enabling the living matter to change,” and Wolsky and Wolsky identify a parallel between this belief and modern biologists’ inclusion of constant adjustment in response to the environment in their criteria for life (162-163).

mode of operation is regular; but they differ from any other type of mechanism known to us in that their working is—to put it in the most non-committal way—accompanied by emotion.³⁶

Emotion, I would argue, replaced the vital spark in his understanding of animals. Emotion is not technically a vitalist concept—it could theoretically be explained in terms of physics and chemistry—but its function in Huxley’s writing is analogous to that of the *élan vital* for vitalists. It is the (currently) inexplicable and unprovable supplement to biological mechanism that makes animals more than mere machines. In recognizing this quasi-vitalism in Huxley’s writing, we can enrich and complicate our current picture of Huxley as an unapologetic scientific rationalist; we can also see an unexpected moment of convergence between his thought and Lawrence’s.

Solitary and Social Animals

One major difference between Lawrence and Huxley, a difference that sets their respective ideological positions in relief against one another, is their representations of how animals behave in groups. Lawrence is invested in the idea of animals as solitary, uncommunicative monads. He elevates the solitary animal as part of his generally individualistic philosophy, which critiques structures like “society” and “civilization” for repressing the human individual and its primitive nature and desires.³⁷ Lawrence’s animal poems thus tend to focus on individuals, or at most mating pairs, rather than on flocks or herds. The problem with this philosophy, which becomes evident when it is juxtaposed with ethological writings like Huxley’s, is that its concept of the animal is narrow and often unrealistic. As Huxley shows us,

³⁶ Huxley, *Essays of a Biologist*, 93-94.

³⁷ Many critics have explored the critique of European and English civilization in Lawrence’s philosophy, including Pericles Lewis in *The Cambridge Introduction to Modernism* (77-79), Margot Norris in *Beasts of the Modern Imagination* (170-194), Philip Armstrong in *What Animals Mean in the Fiction of Modernity* (144-150), and Jack Stewart in *The Vital Art of D.H. Lawrence* (94-116).

many animals *do* live socially, in groups with complex and shifting structures. Thus, even when attempting to celebrate the animal at the expense of the human, Lawrence instead often celebrates his philosophical *idea* of the animal, as a being outside society, at the expense of the diverse lives of real animals.

Huxley faces a different (albeit related) problem when representing animal sociality: to what extent does, or should, human society parallel animal societies? Though he is attracted to the study of certain species because he perceives their social behaviors as good examples for humans to follow, Huxley often betrays anxiety in his writings about how far the analogy can go. His writings help to show us Lawrence's blind spot around animal sociality, but they also introduce their own problems of representation, as their anthropomorphic metaphors and analogies seem to take on a life of their own. Both Lawrence and Huxley seek models for humans to follow in animal behavior, but the parallels are often strained, and neither finds exactly what he is looking for.

Lawrence's animal philosophy owes much to Nietzsche's, whose influence on him is well-documented.³⁸ Nietzsche's anti-humanist writings critique modern human modes of being and privilege animal ones, but only those of certain animals. As Alphonso Lingis argues, Nietzsche prefers solitary species such as tigers and eagles for their power, independence, and wildness, but disdains "herd" species such as cattle and sheep for being weak and domesticated.³⁹ "Wherever there are herds, it is the instinct of weakness that has willed the

³⁸ See, for example, Norris's *Beasts of the Modern Imagination*; Robert E. Montgomery's *The Visionary D.H. Lawrence*; Carl Krockel's *D.H. Lawrence and Germany*; Michael Bell's *D.H. Lawrence: Language and Being*; and Colin Milton's *Lawrence and Nietzsche*.

³⁹ Lingis, "Nietzsche and Animals," 9.

herd,” Nietzsche claims.⁴⁰ The ideal animal, in his philosophy, is solitary, just as the ideal human animal is independent and refuses to be enslaved to bourgeois civilization.

Lawrence adopts this facet of Nietzsche’s thinking, but slightly revises it. In Lawrence’s work, not only beasts of prey but even domesticated herd animals appear as solitary and wild. In *Women in Love*, the heroine Ursula is drawn to the very cattle that Nietzsche disparages because she perceives them as lonely and individual: “From the bottom of her heart, from the bottom of her soul, she despised and detested people... She loved best of all the animals, that were single and unsocial as she herself was. She loved the horses and cows in the field. Each was single and to itself, magical. It was not referred away to some detestable social principle.”⁴¹ Ursula’s distaste for society manifests itself here on two levels. It is not just that she prefers animals to people; it is also that she prefers these animals because she identifies with their apparent unsociability. By relating to such a creature, Ursula distances herself even further from the civilization that she despises.⁴²

We might attribute this idea of the unsocial animal to Ursula, rather than to Lawrence, but the same idea recurs throughout his early and mid-career work. The *Tortoises* sequence (published in 1921 and again in 1923 as part of *Birds, Beasts and Flowers*) develops a narrative that begins with the solitary baby tortoise, autotelic and complete in itself, and culminates in the adult male tortoise, who is rendered incomplete and miserable by sexual desire and can only achieve a momentary, secondary wholeness through coition. The poem sequence begins with “Baby Tortoise,” an 80-line poem that describes its addressee as “solitary” three times, as

⁴⁰ Nietzsche, *On the Genealogy of Morality*, 100-101.

⁴¹ Lawrence, *Women in Love*, 244.

⁴² One might contrast this moment in *Women in Love* with Virginia Woolf’s bovine and ovine analogies in *Between the Acts*. Speaking of people’s need for “society apparently, to be with [their] kind,” Woolf writes that it is “the very same instinct that cause the sheep and the cows to desire propinquity” (37-8).

“alone” five times, and once as an “atom.” Lawrence encodes this solitariness in terms not of lack, but of admiration. The baby tortoise is a “challenge,” a “little Ulysses,” a “pioneer” “pitching itself against the inertia” against all odds. Slowly moving across the garden and taking its first bites, the newborn tortoise symbolizes for Lawrence a pure, individual will, independent of any social or intersubjective connection.

Later poems in the *Tortoises* sequence reiterate the baby tortoise’s unsocial nature. The ironically-titled “Tortoise Family Connections” describes the mutual indifference of the baby tortoise and his parents:

It is no use my saying to him in an emotional voice:
“This is your Mother, she laid you when you were an egg.”

He does not even trouble to answer: “Woman,
what have I to do with thee?”
He wearily looks the other way,
And she even more wearily looks another way still,
Each with the utmost apathy,
Incognizant,
Unaware,
Nothing.

The passage obviously points to some of the more problematic aspects of Lawrence’s gender politics, but it also evinces his fascination with the idea of animals’ singleness. A reptile hatched from an egg, the baby tortoise is free of filial bonds (and the mother of maternal bonds), a freedom that Lawrence here describes in a series of negative terms—“apathy,” “incognizant,” “unaware,” “nothing”—the final three textually isolated as single-word lines. This stress on the absence of familial recognition and feeling gives way, later in the poem, to an emphasis on the tortoise’s autonomy and completeness. In human terms, the tortoise is missing some crucial family feeling; in tortoise terms, it is missing nothing. “To be a tortoise!” exclaims the speaker; “Think of it, in a garden of inert clods / A brisk, brindled little tortoise, all to himself.” Echoing

the sentiment of “Baby Tortoise,” Lawrence concludes in a language not of lack but of bounded wholeness.

In “Fish,” another poem from *Birds, Beasts and Flowers*, Lawrence entertains the possibility of fish sociality but ultimately denies its reality.

Admittedly, they swarm in companies,
Fishes.
They drive in shoals.
But soundless, and out of contact.
They exchange no word, no spasm, not even anger.
Not one touch.
Many suspended together, forever apart.
Each one alone with the waters, upon one wave with the rest.

That many fishes travel in schools means nothing to Lawrence; without language or physical touch, there cannot be any real sociality or intersubjective contact. Fish, he insists, are marked by “pre-world loneliness, / And more-than-lovelessness.”

The fish, like the baby tortoise, is indifferent to others of its kind, but the poem fleetingly indicates that another way is possible. “Even snakes lie together,” writes Lawrence; “But oh, fish, that rock in water. / You lie only with the waters.” The verb “lie” works on multiple levels. Snakes “lie together” when mating, while male fish fertilize the eggs outside the female’s body, after she has already laid them, and this seems to be the primary meaning that the poem invokes. But snakes also literally lie together during their winter hibernation, curling around each other to conserve warmth. The contrast between snake and fish, then, applies not only to their reproductive habits but also to their non-sexual relationships with other members of their kind. This is a moment when Lawrence acknowledges difference between two kinds of animals, and accepts the possibility of sociality or at least togetherness among snakes. The acknowledgement is quickly deflected by his emphasis on the fish’s unsocial aloneness, but a crack in Lawrence’s myth of the unsocial animal individual is momentarily visible.

The myth is further complicated by a formal feature of Lawrence's animal poetry: poems like "Fish" and "Baby Tortoise" employ apostrophe—"You know what it is to be born alone, / Baby tortoise!"—and thus seem to assert the possibility of a social relationship between speaker and addressee. Lawrence's poems play on at least two of the meanings of apostrophe in lyric poetry described by Jonathan Culler. First, apostrophe works to "disrupt the circuit of communication" between speaker and reader; by addressing an object other than the reader, apostrophe can create the fiction that the reader is a mere eavesdropper.⁴³ In the case of "Baby Tortoise" and other animal poems, by addressing the animal Lawrence opts out of the human communication circuit, and enacts as a writer the kind of unsociality that he admires in the baby tortoise. But a second function of apostrophe, according to Culler, is to establish the speaker—and the poet—as someone with a special gift: "One who successfully invokes nature is one to whom nature might, in its turn, speak. He makes himself poet, visionary."⁴⁴ By speaking to nature—more specifically an animal—Lawrence does not so much negate sociality altogether as he displaces it into the realm of poetry. We might assume that both speaker and tortoise are "atoms," solitary and self-contained. But the apostrophe creates the possibility, or poetic fiction, that "nature might, in its turn, speak"—that the animal could hear and respond to the poet. Lawrence's animal apostrophe, then, undermines his thematic insistence on the baby tortoise's unsocial nature by situating him textually in a social, or at least proto-social, relationship with the speaker.

The *Tortoises* sequence seems to derive from Lawrence's attentive observations of the tortoises in his garden in Italy, where he wrote much of *Birds, Beasts and Flowers* in 1920. But even though Lawrence's textual tortoises are likely faithful to their real counterparts in being

⁴³ Culler, *The Pursuit of Signs*, 150.

⁴⁴ *Ibid.*, 157.

unsocial, they are not representative of animality in general. Animal sociality elicited increasing attention from zoologists during Lawrence's lifetime; the social lives of insects, birds, and mammals proved especially compelling for zoological research and popular science, including Huxley's popular science writing. In *Ants* (1929), Huxley defines three different levels of sociality in animals.

In the lowest there is some sort of a family life, either the mother or both parents living with and helping the developing young. This may be called the sub-social, or family, grade. The second is the true social, or colonial, grade, in which the young, when fully grown, stay with their parents and co-operate with them in building the nest and caring for further broods of young. The highest grade is that of the caste-society, in which some of the young are transformed into unsexed 'neuters,' who take off the shoulders of the fertile caste all the duties of the colony, save only that of reproduction.⁴⁵

Not all animals care for their young or engage in an extended family life (the tortoises that Lawrence observed are an example of a group of species that does not raise its offspring), but Huxley considers those that do proto-social. True sociality requires adults other than the mating pair to live together. The caste-society, an anthropomorphic term implying an analogy with Indian politics, is a level of complex sociality that only some insects, such as ants and termites, have attained.⁴⁶

For Huxley the most fascinating social animals, other than humans, were birds. Most of Huxley's original ornithological research focuses on courtship behaviors—he published studies of courtship in the great crested grebe, the wild duck, and the red-throated diver—rather than on true social behaviors. Nonetheless, his popular writings reveal the importance of sociality for birds. In *Bird-Watching and Bird Behaviour* (1930), a book adaptation of his BBC radio lectures,

⁴⁵ Huxley, *Ants*, 2.

⁴⁶ There is a good deal of zoological writing on ants and ant sociality in this period, including works by William Morton Wheeler, Friedrich Alverdes, and Auguste Forel. See Charlotte Sleigh's *Ant* (31-35) for a discussion of Forel's interest in ants.

Huxley describes the role of flock behaviors in bird life. Although they court, breed, and live in pairs during the spring and summer,

these same birds in winter lead a wholly different life. Then they are gathered together into flocks, in which there is neither sexual jealousy nor sexual attraction, no desire to sing, no parental feeling. Sometimes, indeed, the only imprint of sex upon winter life is the existence of flocks all of males, or all of females, as is often the case in chaffinches, the sexes shunning instead of seeking one another.⁴⁷

Much like the tortoises of “Tortoise Family Connections,” the birds of winter lack the family feelings that bind male-female pairs to one another and to their offspring in the summer. Yet in the birds, unlike the tortoises, this indifference allows for true sociality in the form of the flock, which flies, eats, and lives together.

Huxley’s representations of animal sociality navigate what is, for him, a difficult terrain: the question of how and when animal behaviors should be mapped onto those of humans. In *Ants*, Huxley expresses reluctance to make too much of the parallels, observing that while “[i]nnumerable comparisons have been made between human society and the social organization of ant, bee, or termite, ... [a]lmost without exception the moral has been false, the analogy used misleadingly.”⁴⁸ At the same time, Huxley’s writing is strewn with anthropomorphism and metaphors that compare human and animal. After visiting an Arctic cliff in summer, Huxley recalls:

Innumerable kittiwakes, guillemots, and razorbills, with a sprinkling of puffins, crowded the cliff-face, and, near the top, colonies of the huge and predaceous glaucous gulls, the robber barons of the Arctic bird-world... I found it an effort of imagination to recall to mind that this bird-city was but a seasonal affair, and that in the winter the bird-cliff was wholly untenanted.⁴⁹

⁴⁷ Huxley, *Bird-Watching and Bird Behaviour*, 43-44.

⁴⁸ Huxley, *Ants*, 1.

⁴⁹ Huxley, *Bird-Watching and Bird Behaviour*, 32.

The analogies of robber barons and a “bird-city” testify to the anthropomorphic lens through which Huxley sees the multispecies bird colony. But even as these metaphors render the birds’ living situation familiar, Huxley reminds us of how different this bird-city is from a human city, for bird life is seasonal in a way that human life is not. Analogies between humans and birds can thus establish differences as well as similarities. In this instance, Huxley negotiates a challenge that Lawrence also struggles with. He attempts to harness the rhetorical and communicative power of anthropomorphism, a useful tool for understanding and representing animals, but simultaneously tries to avoid erasing the specificity and alterity of nonhuman species.

The metaphor of “robber barons” also suggests that the bad as well as the good elements of human society have parallels in the animal world, and reflects Huxley’s ambivalence about how similar human behavior ought to be to animal behavior. Mary M. Bartley has argued that in the monogamous, egalitarian, and cooperative relations between the sexes in certain bird species (e.g. the grebe and the penguin), Huxley saw a good model for human family life; he found many parallels between these particular bird-species and his own liberal-humanist social views.⁵⁰ But if one should imitate the grebe, one should not imitate the predatory glaucous gull or the violent wild duck. Only well-behaved species could guide humans, implies Huxley. Nature has selected behaviors that are subjectively immoral as well as behaviors that are moral, a finding that sits uncomfortably with Huxley given his faith in the link between evolution and progress.

Projecting human society onto animal societies, or vice versa, might be scientifically as well as morally misleading. At the end of *Ants*, Huxley rejects the “fallacy” that with increasing mechanization and specialization in human society, we are becoming more like the highly specialized and rigidly hierarchical ant. “There is,” he declares, “no reason to suppose that man

⁵⁰ Bartley, “Courtship and Continued Progress,” 91.

is destined to sterilize nurses or manual workers, to breed armoured or gas-resistant soldiers, communal parents the size of whales, or an intelligentsia all head and no body,” as proponents of the human-ant hypothesis feared (or perhaps hoped).⁵¹ Humans differ from other social species, just as other social species differ from each other; what makes for evolutionary success in them is not necessarily good for us. Huxley finds that analogies between the social behaviors of humans and animals make for good talking points in his writing, but he recognizes that there are limits to the analogies’ usefulness.

Huxley and Lawrence share a desire to find models for humans in the animal world—Huxley in the social species and Lawrence in solitary species. The creatures of Lawrence’s menagerie never move beyond the “sub-social, or family, grade” to true sociality as Huxley would define it. Ruled by an individualistic philosophy, Lawrence writes the animal as a solitary “little Ulysses,” free of the social bonds and social rules that constrain humans. Even where the ethologist’s eye would see sociality—the herd of cattle, the school of fish, the flock of birds—Lawrence sees only the bounded individual. Huxley, on the other hand, understands that while not all animals are gregarious, many do live in groups and exhibit complex social behaviors beyond courtship, mating, and the care of offspring. Historians of science have noted the connection between Huxley’s desire to improve human society and his interest in certain kinds of bird “societies.” It would be mistaken, then, to assume that only Lawrence is affected by ideological preconceptions in his perceptions of animal behaviors. At times, however, Huxley questions the extent to which animals can really be moral models for humans, more self-consciously than does Lawrence. His writing illuminates one of Lawrence’s blind spots but also probes its own.

⁵¹ Huxley, *Ants*, 112-113.

Animal Language and Emotional Expression

Social animals, and indeed most solitary animals as well, communicate with members of their own and other species via gestures, coloration, and sound. Huxley observed and attempted to decipher these animal “languages” in order to understand their role in animals’ behavior and psychology. Lawrence, meanwhile, posited a connection between animal language and poetic expression. Huxley and Lawrence found two approaches to understanding animal language available to them. The first is to treat animal language as functional communication, or a vector of information; this is the biological approach, which Huxley espouses and Lawrence derides. The second is to interpret animal sounds as expressions of emotion; this is the psychological approach, and both Lawrence and Huxley make use of it. (As we shall see, the biological and psychological approaches are not limited to the study of animal language, but apply to all animal behaviors.) Though the biological and psychological approaches are ostensibly compatible, two sides of the same coin, in practice they are not so easy to reconcile. Huxley’s flirtation with the psychological approach thus poses problems for his scientific epistemology, while Lawrence discards the biological approach in favor of a psychologicistic and poetic understanding of animal communication.

The very idea that animals could communicate challenged Western philosophies of the animal, which for many centuries have assumed that the difference between humans and other animals lies in language—humans have it, animals do not. Descartes was one of the most influential writers to assert this language barrier, but the idea has a long afterlife. Even poststructuralists, who are anti-Cartesian in many ways, often assume that it is language that inaugurates the human into subjectivity and society. Language, speech, and communication

become hallmarks of the human, whereas animals are perceived as silent, uncommunicative, and therefore deprived.

Lawrence, influenced once again by Nietzsche, tends to romanticize rather than belittle the nonlinguistic animal in his poetry. Vanessa Lemm writes that Nietzsche's anti-humanist philosophy aligns animals with silence (just as his humanist predecessors did), but rather than seeing this silence in terms of lack, Nietzsche contends that it contains a kind of truth that cannot be expressed in human language.⁵² As we have seen, Lawrence follows in Nietzsche's footsteps by reversing the traditional values associated with animal and human. He is likewise attracted to the image of the silent animal, which recurs throughout his poetry. From the snake, which "come[s] like a guest in quiet," to the tortoise, a "voiceless little bird," to the fish, the mosquito, the bat of "Man and Bat," and the elephants of "The Elephant is Slow to Mate," all of which are described with some variant of the word "silent," Lawrence's nonlinguistic animals embody the idea of an inarticulate yet compelling kind of truth.

At the same time, Lawrence's trope of animal silence pushes up against his actual observations of animals, which are often anything but silent and uncommunicative. Some of Lawrence's poems, then, register the same kind of animal sounds that zoologists observed and studied. For just as biologists were more attuned to kinds of animal sociality, they also were more comfortable with the idea of communicative animals than philosophers have been. Darwin, in *Descent of Man*, grudgingly writes, "Articulate language is... peculiar to man," but insists that humans share with other animals an inarticulate, gestural language and enumerates the ways in

⁵² Lemm, *Nietzsche's Animal Philosophy*, 115. Lemm's argument centers around Nietzsche's "On Truth and Lies in an Extra-Moral Sense," which dissociates truth from language. One might object that Nietzschean animals do often speak, for example in *Thus Spake Zarathustra*. I would suggest, though, that the myth of the silent animal and the ventriloquization of symbolic animals are compatible; in neither case are animals perceived as real, corporeal, communicative beings in themselves.

which animals such as dogs, birds, and monkeys express and communicate emotions through sound.⁵³ Huxley, in a book titled (perhaps provocatively) *Animal Language*, declares that nonhuman animals have language; what they lack is speech.⁵⁴ That is, they do not have abstract, arbitrary words for things as humans do, but they are perfectly capable of communicating biologically important information, which for Huxley is the definition of language. Both Darwin and Huxley believe that human language is different from animal language, but they are more invested in revealing the variety and complexity of animal modes of communication than in cordoning off the human mind from animal minds.

Huxley's *Animal Language* (1938) is a multimedia collaboration with the sound recordist Ludwig Koch and the photographer Ylla. The project combines recordings of different animal noises—a wolf chorus howling, a sea lion bleating, a camel grunting—with photographs of the animals making noise and text describing the noises' functions and meanings. The book's multimedia nature suggests, in its very form, that human words are not the only way of communicating, but that something like a picture language, or a language of inarticulate animal noises, could also exist. Not all animal sounds are functional or meaningful—some, like the sound of wings flapping, are merely incidental—but Huxley says that when a sound does have a biological function, it is to communicate with others: “[F]unctional sounds differ from almost all other functional activities of animals, in that they only exert their effect via the senses of another animal, whether of the same or another species.... [W]hen the sound produced by an animal has a function, it is to call to its fellows, to frighten its enemies, to attract its mate, to warn its young.”⁵⁵ Huxley calls these *allaesthetic*, “from the Greek roots for *others* and *perception*,” to

⁵³ Darwin, *The Descent of Man*, 89.

⁵⁴ Huxley, *Animal Language*, 24.

⁵⁵ *Ibid.*, 16.

emphasize their intersubjective character.⁵⁶ He delineates several different types of communicative animal sounds: recognition characters, sexual calls, deflection characters, warning sounds, and true language, i.e. sounds that “impart information of biological value” to other members of the species.⁵⁷

Though Huxley is most interested in the biological functions of animal sounds— attracting mates, keeping the pack together, warning off enemies, and so on—he acknowledges another legitimate approach to these sounds: the psychological approach.

To say that song has a certain function is to give an answer to the question of why birds sing. But if you were to ask the ordinary man or woman why birds sing, they would probably say, because they feel happy, or excited, or full of life. The truth is that whenever any activity of an animal involves consciousness, there are always two answers to our questions about it. One is an immediate answer, in terms of psychology, the other a more remote answer in terms of biological function. And each is in its own sphere a correct answer.... From one angle, the bird sings because it wants to, because it feels like singing; and it feels like singing because it is brimming over with energy, because it is angry, or because it is happy. But from another angle, it sings because song has a biological use, a use of which the singer is doubtlessly wholly unaware.⁵⁸

Because zoology and psychology are as yet two distinct sciences, with different vocabularies and assumptions, they produce different yet complementary answers to the same questions about animal behavior. Huxley, trained as a biologist, is most interested in how behaviors evolve and what makes them evolutionarily advantageous. Yet he also insists that animals have very real emotional and psychological reasons for behaving the way they do.

Indeed, the appendix to *Animal Language* describing the animal sounds on Koch's accompanying record includes, as one of three columns in a table, “Probable emotion expressed: Notes.” The entries in this column blur the boundaries between biological and psychological explanations of different sounds’ meanings. For example, the red fox’s bark, the panda’s whinny,

⁵⁶ Ibid., 16.

⁵⁷ Ibid., 23.

⁵⁸ Ibid., 17-18.

and the zebra's whistle are all classified as "sexual calls," their biological function. Yet the red fox's chattering, the corsac fox's grumbling, and the camel's gurgling are all explained in terms of emotion; they express "excitement," "anger," and "pleasure, satisfaction," respectively. The table reflects the difficulties of distinguishing clearly between the expressive, emotional causes of animal sounds and their biological functions, while affirming the existence and importance of both.

We see this same slippage between the psychological and biological explanations of animal behaviors in Huxley's professional zoological research as well as popular books like *Animal Language*. In the seminal 1914 paper *The Courtship Habits of the Great Crested Grebe*, Huxley writes,

[B]y comparing the actions of the birds with our own in circumstances as similar as possible, we can deduce the bird's emotions with much more probability of accuracy than we can possibly have about their nervous processes: that is to say, we can interpret the facts psychologically better than we can physiologically. I shall therefore (without begging any questions whatever) interpret processes of cause and effect in terms of mind whenever it suits my purpose so to do—which, as I just said, will be more often than not.⁵⁹

The principle expressed here is the same one that Huxley would follow twenty-four years later in *Animal Language*: explain behaviors psychologically when purely biological explanations are not apparent, and employ empathy ("comparing the actions of birds with our own in circumstances as similar as possible") when more scientific methods are unhelpful.⁶⁰ Because Huxley believes that birds are highly emotional (albeit relatively unintelligent) animals, he often finds psychological explanations most useful. Yet we can hear a note of anxiety in Huxley's

⁵⁹ Huxley, *Courtship Habits*, 45.

⁶⁰ As Eileen Crist notes, Huxley's turn to empathy is not just epistemological, but also aesthetic. That is, his writing creates a romantic atmosphere by registering the way the birds' displays inspire similar feelings in the human observer; their courtship is "as thrilling to the birds as it is to the watcher" (quoted in Crist, *Images of Animals*, 179).

defense of his scattershot methodology. He includes this caveat in his study of the grebes because he knows that some people will accuse him of being unscientific when he explains grebe behavior in terms of mind rather than of physiology or biological function.

When Lawrence represents animal sounds in his poetry, he privileges the emotional and expressive side of these behaviors over their biological usefulness. Biological functionality is only a step away from natural selection—indeed, for an evolutionist like Huxley, to think about the biological function of a sound is to think about why a species evolved to make that sound. Lawrence, as we have seen, frequently voiced opposition to such evolutionary thinking. His late poem “Self Protection” (1929) expresses disgust at the theory of natural selection, which “make[s] self-preservation and self-protection the first law of existence.” Lawrence proposes instead his own theory of what makes animals survive and thrive: their capacity for expressing themselves, for giving off vital energy through song or color or play.

As a matter of fact, the only creatures that seem to survive
Are those that give themselves away in flash and sparkle
And gay flicker of joyful life;
Those that go glittering abroad
With a bit of splendour.

Lawrence enumerates several examples in this poem—the nightingale singing, the golden-striped tiger, the piebald mouse—to support his insistence that self-protection through inconspicuousness, silence, and camouflage cannot explain why some species and individuals thrive and others die out. It is probably no coincidence that some of the species Lawrence lists in “Self-Protection”—the nightingale, the tiger, and the hummingbird—are icons of the poetic tradition. By invoking these topoi, Lawrence strengthens his implicit claim that poets understand these animals better than evolutionary biologists ever can.

At this point, the reader of “Self-Protection” may object that Lawrence misunderstands evolutionary theory. The nightingale’s song did not evolve for its protective function, but via sexual selection; likewise for the hummingbird’s vibrant colors. It is certainly possible that Lawrence did not understand the different roles of natural and sexual selection (and that he did not understand why a tiger’s stripes would camouflage it in certain environments).⁶¹ But given his familiarity with the work of Darwin, Huxley, and other evolutionary thinkers, I think this explanation unlikely. Rather, I believe that in “Self-Protection” Lawrence was pointing to a facet of the theory of sexual selection that greatly troubled Huxley. That is, how can seemingly maladaptive traits (like ostentatiously colored plumage in male birds) be selected? How can the emotional and psychological preferences of female animals for conspicuous ruffs or loud singing override the tendency of natural selection to promote safe, inconspicuous appearances and habits?

As Bartley and Durant have argued, Huxley’s belief in the progressive and harmonious nature of natural selection was difficult to square with the apparent sexual selection of traits that did not promote the good of the species (for example, the excessively large and bright tail of the peacock).⁶² This discrepancy led Huxley to downplay or deny the role of Darwinian sexual selection in evolution, instead inventing the concept of “mutual selection,” which he described as

⁶¹ Interestingly, Huxley published a 1936 letter in *The Field* entitled “Protective Colouring” in which he defends the concept of protective coloration against its critics. “Naturally,” he writes, “all colouration need not be protective because some is protective. We know definitely of types of colouration whose function is warning, mimicry, sexual stimulation, threat against rivals, recognition between members of the species, etc. In addition there are many types of colouration to which we can at present assign no function, and there is no reason against these being functionless, or accidents of some other function.” The letter is a response to another *Field* article, but it functions equally well as a response to Lawrence’s poem.

⁶² Bartley, “Courtship and Continued Progress,” 103-104; Durant, “The Tension at the Heart of Huxley’s Evolutionary Ethology,” 157. See also Burkhardt’s *Patterns of Behavior*, 121-122, for a further elaboration of Huxley’s discomfort with sexual selection and his desire to believe that evolution operated for the good of the species.

“a blend between sexual and natural selection.”⁶³ Mutual selection, according to Huxley, promoted monogamy, family life, and sexual monomorphism—i.e., traits that were “good” and that benefitted the species—and thus was more palatable than sexual selection, which often promoted “bad” traits such as polygamy, sexual dimorphism, and impractical courtship displays. Still, the compromise was an uneasy one. When Lawrence, in “Self-Protection,” remarks on the ostentation of bird songs and plumage, we may read it not as a misunderstanding of evolutionary theory but instead as a reminder of contemporary biological controversy over the apparent disharmony between natural and sexual selection.⁶⁴

The debate points to a disharmony between the psychological and biological approaches to animal behavior as well. Sexual selection is essentially a psychological phenomenon, stemming from emotions and psychological preferences, while natural selection is a functionalist phenomenon that promotes biologically useful traits and behaviors. When things go well, as Huxley writes in his paper on the courtship of the red-throated diver, the traits that are sexually selected are also biologically advantageous for their carriers, and “the mind of the species” influences “the future development of colour, structure, and behaviour in the race” for the better.⁶⁵ But when things go badly, the emotions guiding sexual selection are contrary to a species’ best interest, causing the species to dwindle or even die out. The geneticist R.A. Fisher invented the term “runaway selection” to describe cases, such as that of the peacock, in which

⁶³ Huxley, *Courtship Habits*, 68.

⁶⁴ John Marx claims that sexual selection plays a role in *Women in Love* as well, arguing that the novel responds to nineteenth-century anxieties about female choice by modeling, in Ursula and Gudrun, “good” and “bad” female taste in sexual partners (*The Modernist Novel and the Decline of Empire*, 154-156). My analysis of “Self-Protection” might lend support to such a claim by offering evidence that Lawrence was indeed aware of controversies surrounding sexual selection, but it also might complicate it. Marx sees *Women in Love* as solving a problem in sexual selection theory, whereas I think the poem is merely highlighting a problem that Lawrence, given his antipathy to evolutionary theory in general, had no interest in solving.

⁶⁵ Huxley, “Courtship Activities in the Red-throated Diver,” 288.

“plumage development in the male, and sexual preference for such developments in the female, must thus advance together... with ever-increasing speed” until some check is imposed.⁶⁶ The result is secondary sexual traits, and *preferences* for such traits, that continue to be selected despite disadvantaging the species. Eugenicists worried that something similar could happen in humans, that sexual selection could lead to degeneration if it were not directed toward eugenic ends. Fisher himself wrote in 1930, “[S]exual selection must be judged to intensify the speed of whichever process, constructive or degenerative, is in action,” a statement that he applied to both animals and humans.⁶⁷ The specter of degeneration through sexual selection cast doubts on Huxley’s optimistic evolutionary theory, and it also frustrated the assumption that biological function and psychological feeling would always be harmonious.

Like “Self-Protection,” “Turkey-Cock” also feigns ignorance about the existence of sexual selection while needling biologists about possible gaps in their evolutionary theory. The poem registers the strange aesthetic effects of the turkey, its “sort of gorgeousness” that is “Dark and lustrous / And skinny repulsive,” “that evokes my most puzzled admiration.” “Why do you have wattles, and a naked, wattled head?” asks the speaker. He supposes that “it is your assertion, in all this ostentation, of raw contradictoriness,” rather than acknowledging the possibility that it is a decorative feature to attract female turkeys. The wattle is, for Lawrence, the turkey’s perverse version of the hummingbird’s “sparkle.” The poem’s “puzzled admiration” for the turkey’s visage recalls Charles Darwin’s puzzlement over the turkey’s appearance.

Discussing sexual selection in *The Origin of Species*, Darwin notes that not all secondary sexual differences emerge from sexual selection; some peculiarities “we cannot believe to be either useful to the males in battle, or attractive to the females.” Among these peculiar traits is “the tuft

⁶⁶ Fisher, *The Genetical Theory of Natural Selection*, 137.

⁶⁷ *Ibid.*, 252.

of hair on the breast of the turkey-cock,” which “would have been called a monstrosity” had it arisen under domestication.⁶⁸ “Turkey-Cock” obliquely reminds scientifically-minded readers of Darwin’s confusion while expressing grudging appreciation of the turkey’s bizarre display.

As we have seen, Lawrence preferred the psychological to the biological approach to animal behavior because the latter was inextricably tied up with an evolutionary theory he detested. Doubtless he would also consider the psychological approach closer, and more amenable to, the work of poetry; art, especially Lawrence’s art, tends to privilege emotion over function and subjectivity over objectivity, and psychology thus seems closer to art than biology is. When animals are granted voice in Lawrence’s poetry, it is usually a means of expressing emotions rather than the functional sounds Huxley would call “true language.” In these moments, animal expression and poetic expressionism go hand in hand, and animals sometimes even seem to be natural expressionist poets themselves.

“Self-Protection” places self-expression at the center of animal life. It attributes the nightingale’s song, the hummingbird’s sparkling colors, and the mouse’s play to an exuberant overflow of vitality, signaled by the aesthetic spectacle of their flashing, glittering, and singing. This sense of energy and spontaneity in animals is mirrored by Lawrence’s own expressionist poetics. Unlike the more disciplined, constrained formalism of some of his modernist peers, Lawrence’s poetry embraces formlessness. It is characterized by free verse, long lines, and phrases that spill over from line to line. In his essay “Poetry of the Present” (1918), Lawrence elaborates his theory of poetics, endorsing spontaneity, flexibility, and an unfinished quality. Lawrence writes,

We can be in ourselves spontaneous and flexible as flame, we can see that utterance rushes out without artificial foam or artificial smoothness. But we cannot positively

⁶⁸ Darwin, *The Origin of Species*, 90.

prescribe any motion, any rhythm. All the laws we invent or discover—it amounts to pretty much the same—will fail to apply to free verse. They will only apply to some form of restricted, limited unfree verse.⁶⁹

The poetry of the present is about the natural, not the artificial, about “direct utterance from the instant, whole man” (and for Lawrence, the poet is by default a man).⁷⁰ It is about the same kind of unfettered self-expression that Lawrence sees in the nightingale and the tiger. Even the simile of “flame” in “Poetry of the Present” has its imagistic echo in the “flicker” and “sparkle” of the animals in “Self-Protection.” Carrie Rohman has argued that Lawrence’s poetics “connects human to animal and both to broader cosmological powers in a posthumanist becoming-artistic of the living.”⁷¹ She links Lawrence’s poems to the philosopher Elizabeth Grosz’s theory that art is a creation of the animal world, not the human world. While I am skeptical of Rohman’s cosmological claims about “the shared vibratory experience between human and animal minds, bodies, and being in general,” I share her sense that for Lawrence there is continuity between human poetry and animal expression.⁷²

This link between poetic and animal expression, like Lawrence’s distaste for biological explanations of animal expression, recurs in many of his poems. In “Mosquito,” for example, Lawrence describes the insect’s “small, high, hateful bugle in my ear” as a maladaptive habit:

Why do you do it?
Surely it is bad policy.
They say you can't help it.
...
But it sounds so amazingly like a slogan
A yell of triumph as you snatch my scalp.

⁶⁹ Lawrence, *Complete Poems*, 184.

⁷⁰ *Ibid.*, 184.

⁷¹ Rohman, “The Voice of the Living,” 170.

⁷² *Ibid.*, 181.

Lawrence's speaker thinks the mosquito's buzz is "bad policy" because it alerts him to its presence; it would be more biologically successful if it were silent as it approached its prey. "They"—perhaps entomologists?—say the noise is involuntary, but the speaker cannot help but hear intention and emotion in the sound. In typical primitivist fashion, Lawrence uses the phrase "snatch my scalp" to associate the mosquito with the figure of the Indian brave who makes war whoops and scalps his enemies. By 1923, many of Lawrence's readers would perceive this Indian as a figure of the past, a warrior who lost the "battle for survival" in the Americas and thus makes a good metaphor for the badly adapted mosquito. Whether an involuntary, maladaptive sound or an uncircumspect expression of triumphant feeling, the mosquito's buzz seems impossible to reconcile with functional utility. Yet the poem expresses a reluctant admiration for the mosquito; the speaker wants to mimic the creature and "out-mosquito" him, a feeling consonant with the philosophy of "Self-Protection." The buzzing mosquito, like the singing nightingale, has its own kind of "flash and sparkle." So do other creatures in Lawrence's poetic menagerie. "The Blue Jay" with its "strident laugh, the "Lizard" with its "swirl of a tail," the "Peacock" with its "stream of blueness," and the "wild animals [that] trot with splendour" in "Paltry-Looking People" all exemplify the capacity for colorful and noisy self-expression that Lawrence admires in animals.

In "Tortoise Shout," the final poem in the "Tortoises" sequence, Lawrence leaves no doubt that the tortoise's cry is an expressive rather than a functional sound. Revising his earlier description of the tortoise as silent, Lawrence writes, "I thought he was dumb, / I said he was dumb, / Yet I've heard him cry." The tortoise makes a faint yelling sound during mating, a noise that reminds the speaker of countless other inarticulate animal noises. Lawrence lists these animal noises in a Whitmanian free-verse series:

I remember, when I was a boy,
I heard the scream of a frog, which was caught with his foot in the mouth of an up-
starting snake;
I remember when I first heard bull-frogs break into sound in the spring;
I remember hearing a wild goose out of the throat of night
Cry loudly, beyond the lake of waters;
I remember the first time, out of a bush in the darkness, a nightingale's piercing cries and
gurgles startled the depths of my soul...

The list goes on for eleven more lines, including the sounds of rabbits, heifers, cats, horses, lambs, and people. The profusion of syllables and lines in this series seems apt to represent the excessive nature of these animal sounds—these lines create an effect of “too-muchness,” of too intense feeling and too many words. The animal noises Lawrence describes are mostly involuntary, expressing physical pain or sexual climax (and indeed, in the poem there is little difference between the two). These are not the functional, communicative sounds Huxley found in nature; they are figured instead as primal, pre-linguistic upwellings of feeling.

Lawrence unites all these animal noises under the umbrella of sexual difference and sexual intercourse, even the ones, such as the scream of a frightened horse or the bleating of a lamb, that seem to have nothing to do with sex. “Tortoise Shout” describes in mythological terms “the wheel on which our silence first is broken”:

Sex, which breaks us into voice, sets us calling across the deeps, calling, calling for the complement,
Singing, and calling, and singing again, being answered, having found.

The idea here is not altogether contradictory to Huxley's understanding of animal language; having studied and written extensively about bird courtship and the role of bird song, Huxley would be the first to acknowledge the role that courtship and mating play in many (though not all) animal sounds. It is the totalizing, mythologizing tone of “Tortoise Shout” that is incommensurable with the biological-functional understanding of animal noises. At the end of the “Tortoises” sequence, Lawrence abandons the tortoises' specificity in order to make a much

larger claim that animal expression (including human expression) originates in sex and sexual difference. We see similar implications in the poems “St. Luke,” in which the bull bellows and moans because he is “[c]onstrained to pour forth all his fire down the narrow sluice of procreation,” and “The Ass,” whose protagonist brays because “[h]e fell into the rut of love” and longs for a mare. In all of these cases, particular animals are reduced to emblems of animality, which becomes a shorthand for primal sexual urges. Having collapsed the differences between various species, individuals, and behaviors, Lawrence is back to the philosophical animal, a creature of inarticulate (though no longer silent) drives and instincts.

A key exception to Lawrence’s anti-biological understanding of animal sounds is “She-Goat.” In this poem, the goat’s vocalizations are given a communicative function and even portrayed typographically as language, as Lawrence writes a conversation between the speaker and the goat, who is calling for the speaker to come untie her:

Merr-err-err! Merr-er-errr! Mer! Mé!
Wait, wait a bit, I'll come when I've lit the fire.
Merrr!
Exactly.
Mé! Mer! Merrrrrrr!!!
Tace, tu, crapa, bestia!
Merr-ererrr-ererrr! Merrrr!

The goat’s calls seem to be merely another foreign language because they are italicized, they use the non-English letter “é,” and they are interspersed with the speaker’s English and Italian. The acute accent mark is typically used in Italian to differentiate between homonyms; in the case of the made-up word “*Mé!*” it forecloses the possibility that we could understand the goat as saying the English word “me.” The poem, of course, gets to have it both ways—the goat’s cry is both “*Me!*” and not “*Me!*” to the reader, but either way it is an assertion of her presence. Regardless of the linguistic content of these noises, the speaker has no difficulty translating the goat’s

calls—she is tied up in the shed, and she wants to be free. The goat’s bleats, whatever their psychological explanation, have an ethological function that they accomplish. Perhaps Lawrence perceives the goat differently from other species because it is domesticated, living and communicating with humans; or perhaps we are back to the distinction between grand animal symbols and specific animal others that critics like Inniss and Rohman have identified in Lawrence’s work. Whatever the reason for the inconsistency, Lawrence portrays the goat’s vocalizations as specific, functional, and outside the mythology of animal sounds that he envisioned in “Tortoise Shout.”

For both Lawrence and Huxley, animal noises serve as the terrain on which they map out their own conflicted approaches to animal behavior. Huxley claims to prioritize the biological over the psychological mode of interpretation, saying he is more interested in function than in feeling. Yet in practice, he often understands animal noises as expressions of emotion rather than as biologically useful messages. Lawrence, meanwhile, resists the notion of biological utility because it is linked to natural selection. He prefers to envision animal calls as poetic self-expression or as signals of primal sexuality. But sometimes, as in “She-Goat,” the poet betrays what the animal keeper senses: that some animal noises are clear, purposeful, and effective efforts at communicating specific information. “Communication” and “expression” have different emphases—one is more other-oriented, the other more self-oriented—but they are not necessarily incompatible concepts; animal noises can be both expressive and communicative. The psychological and biological ways of interpreting animal behavior, however, are not so easy to reconcile, a problem I will explore further in the next section.

Animal Spirits, Vitalism, and Play

Lawrence and Huxley disagree on the extent and nature of animal sociality and communication, but one aspect of animal behavior that they both acknowledge and value is play. Lawrence considers play a vitalist impulse, not unrelated to the drive toward self-expression thematized in “Self-Protection” and other poems, while Huxley takes account of its biological and evolutionary origins. Yet both recognize play as existing uniquely outside the functional array of animal behaviors. Not all animals are playful, of course. Huxley declares that “[w]ith the possible exception of ants, play is unknown outside the vertebrates,” while many of the protagonists of Lawrence’s animal poems are too focused on courting and mating to play.⁷³ Only when the biological imperatives to survive and reproduce are put aside do the menageries of these writers turn to the often purposeless yet pleasurable activities of play. Huxley’s explanations of certain kinds of play even betray a quasi-vitalist sympathy that is in keeping with his psychological-emotional explanations of animal behavior, and that brings him closer to Lawrence’s view of animals than we would expect.

Lawrence’s poem “Fish” links play to *joie de vivre*, a mysterious and pure aspect of Lawrentian animal experience. At first, the poem’s speaker perceives the fish as lacking any experience or emotion whatsoever—“No fingers, no hands and feet, no lips; / No tender muzzles, / No wistful bellies, / No loins of desire, / None.” But gradually he comes to see the fish’s life as substantial and full of meaningful experience, despite its alienness. (The trajectory resembles that of “Tortoise Family Connections,” described above, in which the rhetoric of lack shifts to a more positive language of authentic, whole animal experience. Lawrence even echoes the line “To be a

⁷³ Wells, Huxley, and Wells, *The Science of Life*, vol. 4, 1252. I attribute this quotation, and later ones in the chapter, to Huxley because he seems to have written the animal behavior sections of *The Science of Life*.

tortoise!” with “To be a fish!”) Fish experience, as the speaker imagines it, consists of “Joie de vivre, and fear, and food, / All without love.”

What is this joie de vivre that prompts the speaker to exclaim, “Quelle joie de vivre / Dans l’eau!”? Lawrence describes it as more than an exultant impulse to enjoy life; it is also a special, quasi-erotic relationship with the water in which the fish lives. Lawrence’s concept of joie de vivre is “without love,” i.e. sexual desire, and distinct from “food, and fear,” or the instincts that help an animal survive. The shift from English to French stresses how separate joie de vivre is from fear and appetite, and suggests how difficult the concept is to define in language. It lacks evolutionary utility (unlike fear and appetite), and yet Lawrence portrays it as integral to fish life. The external sign of this joie de vivre is the fish leaping out of the water and dropping back into it, a play behavior:

To have the element under one, like a lover;
And to spring away with a curvetting click in the air,
Provocative.
Dropping back with a slap on the face of the flood.
And merging oneself!

Here, the fish’s expression of joie de vivre is accentuated by the stanza’s style. The onomatopoeic quality of “curvetting click” and “slap” allows the reader to almost hear the fish as it breaks the plane of the water in its leap, while the anapestic rhythms of the second and fourth lines offer a hint of rollicking playfulness in an otherwise solemn stanza.

A later poem, “Little Fish” (1929), rewrites this aspect of “Fish” without the philosophical weightiness—the five-line poem can also be considered a little “Fish.” The poem mixes a playful, even child-like style with an implicitly vitalistic conception of animal life:

The tiny fish enjoy themselves
in the sea.
Quick little splinters of life,
their little lives are fun to them

in the sea.

To call the fish “splinters of life” is to envision them as made up of a special kind of matter imbued with life, as well as to emphasize their vivacity. The style of “Little Fish” mimics the playfulness of its subjects. It is itself a little poem, full of repetition like a nursery rhyme, minor in import, yet within its own small scope lively and enjoyable.⁷⁴ Lawrence here goes much further than Huxley in seeing play and the experience of “fun” in the animal kingdom. Huxley writes in *The Science of Life* that while mammals like dolphins play with one another and with boats, “[n]o fish would ever behave like this. Fish will leap out of the water, but only to avoid their enemies; they will keep poised in the current of a stream, but only because that is the business of their lives.”⁷⁵ Lawrence, on the other hand, perceives playfulness in the fish’s quick, darting motions; and we have seen that he thinks fish have very different reasons for leaping out of the water than to escape predators. The debate persists among ethologists to this day—while scientists have often been hesitant to ascribe playfulness to fish, a few have suggested that fish may engage in play behaviors, and the psychologist Gordon M. Burghardt devotes an entire chapter in *The Genesis of Animal Play* to play in fish.⁷⁶ Lawrence’s perception of playfulness in the fish, then, may be not altogether fantasy but a real psychological possibility.

Other playful animals appear sporadically throughout Lawrence’s poetry. The mice that “play at shadows” in “Self-Protection” are only one of many examples. “Humming Bird” envisions prehistoric hummingbirds expressing their vitalistic essence through play. “While life was a heave of Matter, half inanimate,” writes Lawrence, “[t]his little bit chipped off in

⁷⁴ “Little Fish” belongs to the volume *Pansies* (a play on “*pensées*,” or thoughts), a volume in which many of the poems are quite short. Nevertheless, “Little Fish” stands out even in this volume as a case in which the subject matter and the form are especially complementary.

⁷⁵ Wells, Huxley, and Wells, *The Science of Life*, vol. 4, 1252.

⁷⁶ See Chapter 13, “The Origins of Vertebrate Play: Fish That Leap, Juggle, and Tease,” in Burghardt’s *The Genesis of Animal Play* (309-358).

brilliance.” These hummingbirds, sparks of vital matter, play by “racing down the avenues” and “whizzing through the slow, vast, succulent stems.” In “Bibbles,” Lawrence’s ambivalent poem about his dog, he complains about her indiscriminate affections but admires her playful spirit, which “turn[s] the day suddenly into a black tornado of *joie de vivre*.” And in “When I Went to the Circus,” a poem from *Pansies* (1929), Lawrence contrasts the circus animals and people, who “seemed to enjoy the game” of physical performance, with the audience members, who “see the carnal body dauntless and flickering gay / playing among the elements neatly” and feel depressed because they cannot enjoy this kind of embodied play themselves. Play, in all of these poems, is the animation of a vital spirit that Lawrence endorses as the antidote to modern, mechanistic human life.

Huxley theorizes animal play more directly than Lawrence. He wrote an article for *The New Statesman* in 1924 entitled “Birds’ Play and Pleasure,” in which he describes rooks’ “Olympic games of the air.”⁷⁷ And in *The Science of Life* (1929-30), he and his co-authors devote a seven-page section to “Play.” The section is part of a chapter on vertebrate behavior that Huxley wrote, reflecting his belief that play is peculiar to the “higher animals.” Huxley argues that some, but not all, cases of animals playing have a biological purpose:

From the point of view of its evolution and its biological meaning, play seems to have a double origin. There is the play which is biologically useful as a preparation for adult life; this is play in the strict sense. And there is the play which results from a mere surplus of energy being directed into pleasurable or exciting outlets; this, if we want to distinguish it, we can call sport.⁷⁸

Huxley contextualizes this double claim within the literature on animal psychology and behavior. While some (notably Karl Groos, author of the 1898 *The Play of Animals*) argue that all play is useful in some way and thus explicable through natural selection, others insist that all play is

⁷⁷ Huxley, “Birds’ Play and Pleasure,” 418.

⁷⁸ Wells, Huxley, and Wells, *The Science of Life*, vol. 4, 1254-1255.

merely “an aimless overflow of energy.”⁷⁹ Huxley’s hedging claim allows him to have it both ways—his Darwinian outlook pushes him to search for the adaptive significance in play behaviors, but his Romantic view of animals, especially birds, is satisfied by the claim that some play behaviors are motivated only by a psychological-emotional impulse toward pleasure and fun.

Indeed, Huxley declares in the “Play” section that most mammals play as training for adult activities such as hunting, whereas most birds play merely to expend energy and enjoy themselves. We can see an example of the latter in *Bird-Watching and Bird Behaviour*, when Huxley describes a group of birds cavorting through the air in acrobatic fashion:

The appearance of the motion is difficult to describe, but at least the reason for the performance is not far to seek. It is sheer pleasure in motion and its control—play, or sport, if you will, but in any case the same pleasure which we ourselves find in diving, or tobogganning, or skiing, or motoring. Many kinds of birds thus play tricks in the air for the mere pleasure of playing them. Rooks will fall through the air in just the same way, only from a much greater height; I have seen our own English heron, for all its size and apparent stolidity, go through the most extraordinary series of somersaults from four to five hundred feet up; ravens over and over again will turn three parts on their backs and glide.⁸⁰

Huxley’s characteristic analogies with human behaviors, in this case sports like diving and skiing, support his implicit claim that birds are like humans emotionally and thus have a similar sense of fun and excitement to ours. Indeed, his interpretation of the birds’ behavior hinges on this analogy—he can only recognize the birds’ swoops and somersaults as sport because they remind him of human activities. And the playful humor of the “stolid” English heron somersaulting through the air comes from an implied analogy with stolid English gentlemen, an image incongruous with such antics. There is a kind of empathic knowledge at work here, just as there was in *The Courtship Habits of the Great Crested Grebe* when Huxley declared that we

⁷⁹ Ibid., 1255.

⁸⁰ Huxley, *Bird-Watching and Bird Behaviour*, 19-20.

could understand grebe behavior by imagining ourselves in their position. Huxley thinks he knows that the birds somersault for fun because he can identify no other purpose, and because he would consider it fun were he in their position. It is an argumentative move that is not so far removed from Lawrence's intuitive epistemology.

Huxley's emphasis in the above passage on "sheer pleasure" and "mere pleasure," rather than on the expenditure of excess energy, reveals his discomfort with the rhetoric of energy as an explanation for animal play. Although he equates play for pleasure with play to expend energy, uniting the two under the umbrella of "sportive play," he remains suspicious of the latter mode of explanation. Remarking that play in adult animals is usually "described somewhat obscurely as an outlet for surplus energy," Huxley objects to this description because it fails to account for cases where the play behavior is sparked not by an internal surplus of energy, but by an external situation (e.g. a cat finding a mouse, or an egret returning to its nest).⁸¹ Yet I think Huxley has another reason for resisting the energy rhetoric, beyond that rhetoric's misleading implications about the catalysts for play. If "energy" refers to the mysterious life force posited by vitalists, or the "*energie spirituelle*" of Bergson, then it is too vague a concept to be of any value to biologists; it is, as Huxley famously said, about as useful as explaining a train's motion by positing an "*élan locomotif*."⁸² If, on the other hand, "energy" refers to metabolic energy, then the idea of play as ridding the animal of its energy surplus is mechanistic in the extreme, removing emotion and psychology from the picture in order to explain behavior only through physiology. Huxley could no more accept this purely mechanistic explanation than he could the purely vitalist one. Releasing excess energy is what machines or systems do; animals enjoy themselves.

⁸¹ Wells, Huxley, and Wells, *The Science of Life*, vol. 4, 1254.

⁸² Huxley, *Essays of a Biologist*, 39.

Huxley often prefers the explanatory powers of psychologism and anthropomorphism to those of pure mechanism. It is nevertheless surprising that his colleague Solly Zuckerman calls him a “vitalist.” Huxley was not a vitalist in the strict sense; he did not believe there was a special *élan vital* that distinguished organic from inorganic matter. Indeed, *The Science of Life* devotes a section, entitled “The *Élan Vital* and the Life Force,” to arguing that biology does not need to posit a life force to explain life or evolution. But Zuckerman goes on to note that “unlike [the behaviorist] J.B. Watson, [Huxley] was very much against the idea of explaining bird behavior in terms of conditioned reflexes.”⁸³ To reduce play to a mere reflexive or metabolic activity went against everything Huxley believed about the existence and importance of feelings in animal life. This is why I have called Huxley a “quasi-vitalist”; emotion, for him, takes the place of the vital spark in explaining the difference between animals and machines. We have seen that Huxley uses emotion to explain many animal behaviors, not just play. But I think his discussion of sportive play is the best evidence for his quasi-vitalism because it is the only case in which the emotion in question, pleasure in sport, has no obvious biological purpose. Other emotions, like fear, sexual excitement, or the contentment that grebes experience after their mutual courtship displays, are biologically useful and can be explained in terms of natural selection. Only the joy of sportive play seems, in Huxley's schema, to exceed these biological and ecological systems. And if we follow this line of thinking to its logical conclusion, only those creatures that engage in sportive play—birds and mammals, the “higher animals”—are really more than complex biological machines.

Describing animal play gives Huxley the opportunity to be playful in his prose (as Lawrence was in his verse) and to deviate from his usual identity as the voice of scientific

⁸³ Zuckerman, “Comments and Recollections,” 163.

reason. In *The Science of Life*, Huxley begins his discussion of play with the scientific, didactic language of definitions and functions, but quickly turns to a more imaginative register:

What is the biological function of play? Let us consider a few examples to clear our minds about this question. We are standing in the bows of a steamer in the Mediterranean. Some distance away we see a series of leaping forms, one behind the other, each curving over in a semicircle to dive below the surface and re-emerge a few seconds after. They are a file of dolphins.⁸⁴

By the third sentence, Huxley is no longer in the realm of scientific textbook-writing; he is in the world of fiction. What follows is a detailed, lively narrative of dolphins playing with a ship, “twisting up,” “circl[ing] right round the ship,” and “gambol[ing] around the bows.” In the conclusion to this passage, Huxley writes, “Those who prefer everything to be sensible and simple have suggested that porpoises really frequent the bows of ships to rub barnacles and other encumbrances off their backs; but the unanimous verdict of those who have watched them is that this is not so—the porpoises are not being reasonable, they are being playful.”⁸⁵ These words are surprising given that we would expect Huxley himself to be one of “those who prefer everything to be sensible,” and who would reject the intuitions of dolphin-watchers as insufficiently scientific. What he says of the porpoises might justly be said of the writer too—he is not being reasonable here, he is being playful. Huxley’s turn to fiction and his unexpectedly whimsical conclusion are evidence that extra-scientific, even poetic, ideas about animals affect his understanding of play.

Zoologists today continue to ask questions about animal play, its evolutionary origins and functions as well as its psychological meanings. While a good deal of data on animals’ play behaviors has been collected, there is still no consensus on how to define play. As Marc Bekoff and Colin Allen write, “Attempts to define it functionally face the problem that it is not obvious

⁸⁴ Wells, Huxley, and Wells, *The Science of Life*, vol. 4, 1252.

⁸⁵ *Ibid.*, 1252.

that play serves any particular function either at the time at which it is performed or later in life. Indeed several authors have been tempted into defining play as functionless behavior.”⁸⁶ Bekoff and Allen settle for a provisional definition of play as motor activities that *appear* purposeless, reserving the possibility that a purpose will be found with further study. In their emphasis on purposelessness they faintly echo Huxley’s Romantic impulse to see play as purely about pleasure, but the real issue for them is that play serves different purposes for different animals at different points in their lives. Indeed, Gordon M. Burghardt suggests that the capacity for play has evolved multiple times across different phylogenetic lineages, and that even such creatures as turtles can play after their own fashion.⁸⁷ Though subjective experiences such as pleasure or fun in play cannot be measured or even proven to occur, zoologists who study play today continue to invoke these terms, as long as they are safely contained within quotation marks or questions. As Maxeen Biben asks in her study of playfighting in squirrel monkeys, “But why not invoke fun?”⁸⁸ The query captures, in its very semantics, the tenuous yet persistent position that psychological experiences continue to have in scientific understandings of animal behavior.

Animal play is a point of convergence for Lawrence and Huxley. Lawrentian *joie de vivre*, signaled by animals playing, is not altogether different from the feeling that motivates Huxleyan sportive play. Neither is itself directly observable, nor deducible from biological theory, and yet Lawrence and Huxley maintain a faith in their existence. For both writers, watching animals play has a contagious effect on their writing style; and for both, it inspires a sense that there is more to animal life than merely the functional biological instincts that help a creature survive and reproduce. Whether this “more” is a vital force that animates all aspects of

⁸⁶ Bekoff and Allen, “Intentional Communication and Social Play,” 99.

⁸⁷ Burghardt, “The Evolutionary Origins of Play Revisited,” 21.

⁸⁸ Biben, “Squirrel Monkey Play Fighting,” 165.

life or the emotional excess that makes some animals, although machines, not “*mere machines*,” is a matter of debate; but the intuitive, empathic belief in this “more” is shared by both writers. It is not surprising to find vitalism in Lawrence’s poetry, but it is surprising to find vitalist sympathies in Huxley’s work. Such a finding suggests that he was not immune to the complex of Romantic ideas about animals which find such clear expression in Lawrence’s writing, and that these ideas inflected his usually rationalist understanding of the natural world.

Conclusion: Images of Opposition

On the surface, the conflict between Lawrence’s and Huxley’s approaches to animals seems to be a conflict between primitivism and scientism. On one side, a web of associations among animality, instinct, un- or pre-sociality, feeling, and nonlinguistic truth; on the other, a system of statements about animals based on reason, observation, experiment, objectivity, and intellectual rigor. But scratch the surface, and we begin to uncover complications and inconsistencies in this portrait of the authors, for the poet was well acquainted with modern biology, and the biologist was susceptible to Romantic influences. We cannot trust Lawrence’s claims that the cows in the field are single and unsocial and the tortoise is silent and uncommunicative. But no more should we take as transparent fact Huxley’s claim that the feeling birds get when swooping and plunging is the same one we get when skiing or diving. In both cases, there are more proximate explanations for how the writers interpret and represent these animal behaviors—it is a matter of seeing what they want to see.

What Lawrence wants to see is confirmation of his philosophical beliefs about animals—that they are the natural, unrepressed, authentic individuals he wishes people could be. Huxley’s work evinces selection bias too—he pays most attention to animals that feel, play, and socialize

in ways similar to humans, looking for confirmation of his belief in evolutionary harmony and progress. Lawrence generally depicts “the animal” as the opposite of the social, civilized human, while Huxley generally depicts it as a *version* of that human. Yet there are important exceptions to these tendencies, moments when the authors—or their texts—recognize the ill fit between their schemas and the natural world. Both Lawrence and Huxley were working within a network of influences and pressures, including scientific epistemology, modernist primitivism, philosophy (both humanist and anti-humanist), the mechanist-vitalist debate, cultural politics, literary tradition, and certainly not least, their observations of real birds, tortoises, and other creatures. Each writer actively sifted through and managed these factors, but given their multiplicity, it is little wonder that neither created a fully consistent program for interpreting and representing animal behavior.

Though I have tried to uncover new details in our portraits of Lawrence and Huxley, this chapter’s arguments also contribute to our understanding of the relationship between literary modernism and modern science more generally. One of the most powerful narratives of aesthetic modernism, especially in its more Romantic and expressionist strains, is that it emerged as a reaction against Victorian positivism and science. As Michael Bell writes, “Through much of the nineteenth century natural science had been the paradigmatic form of truth statement: as was evident in the way the fiction of the period constantly modeled itself... on science.” But developments in science and philosophy led the writers of the modernist generation to lose faith in the certainties of positivism and its associated literary form, realism.⁸⁹ The disillusionment with nineteenth-century epistemologies and ideologies has been linked to the modernist embrace

⁸⁹ Bell, “The Metaphysics of Modernism,” 11.

of myth, primitivism, uncertainty, psychoanalysis, and other forms of thought that cast doubts on empirical truth-claims.

I believe that the opposition between, on one hand, positivism and scientific reason, and on the other, the Romantic-inspired modernisms of figures like Lawrence, Nietzsche, and Bergson is quite real, but there are two ways that I would amend this narrative. First, we should recognize that “Victorian” scientific ideologies were not strictly Victorian in that they did not go away upon the turn of the century. As we have seen, Lawrence was battling not just the ghost of Darwin but also the living Huxley and his scientist colleagues. Thus, a story about the transformation of nineteenth-century positivism into twentieth-century uncertainty is misleading; the two ideologies coexisted and coevolved from at least the late nineteenth century on. Second, we should re-envision the nature of this “opposition” or “reaction.” If Lawrence opposed, or reacted against, Huxleyan scientific rationalism, and vice versa, it was not in the sense of turning away, but rather of turning toward and actively engaging. The relationship between Lawrentian modernist Romanticism and Huxleyan science is one of informed critique and migration of ideas, not of blind rejection and disengagement. This case study of Lawrence and Huxley offers a new image, then, for understanding the conflicts between modernism and its “Victorian” others—an image not just of a rift, but of a bridge as well.

When Lawrence and Huxley watch animals, a number of things mediate their observations, including the “voices of education,” scientific and philosophical traditions, and their expectations and desires. The next chapter discusses a new kind of mediation that affected people’s view of animals in the early twentieth century: the medium of film. When wildlife watchers become filmgoers, a new set of cultural factors, some imported from the Victorians and others peculiar to the modernist period, begins to tint their views of animals.

CHAPTER III

MODERNIST NATURAL HISTORY IN THE CINEMA: *SECRETS OF NATURE*

Secrets of Nature is a series of film shorts produced by British Instructional Films between 1922 and 1933. Boasting titles such as *Romance in a Pond*, *The Cuckoo's Secret*, and *The Plants of the Pantry*, the films combine the domestic narratives of small-time natural history with the technologies and visual styles of the twentieth century. In *Magic Myxies*, for example, a film about a group of slime molds called myxomycetes, anthropomorphic and moralizing discourses push up against a modernist visual register. The narrator, describing the process in which individual “myxies” form pairs and then groups, notes, “If the myxie has been so bad-tempered that it has failed to find a partner, it is not allowed to become one of the party, but is eaten up! This is a far greater encouragement to matrimony than any tax on bachelors.” This kind of rhetoric, which uses the behavior of other species to allegorize human social behavior, is common in the *Secrets*, and it echoes the rhetoric of Victorian natural history. But it is belied by the images of the film—the myxies look nothing like human avatars. In fact, what is most striking about them is how little they resemble any creature with which we are familiar—their sliding, undulating, shape-shifting movements look more like the patterns of waves or trickling water than like the motion of any animal we know (Fig. 4). Read through the image track, *Magic Myxies* seems more concerned with highlighting the power of cinematic and microscopic technologies to capture strange, abstract-looking, moving forms than with creating fables of human society.

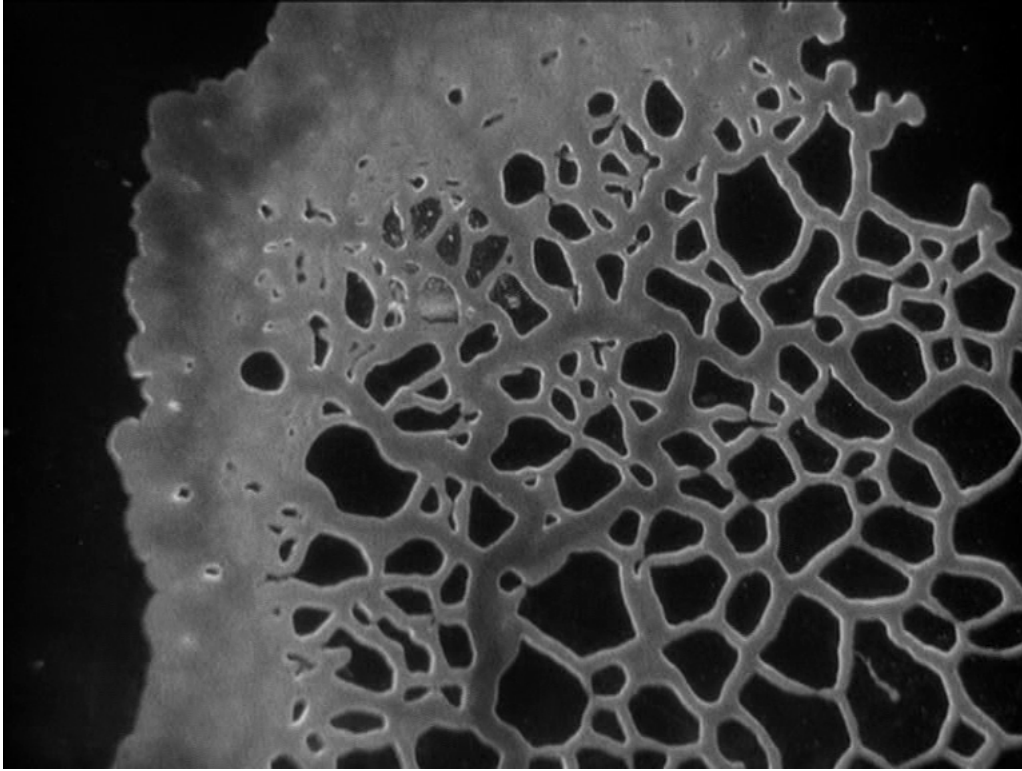


Figure 4

The *Secrets of Nature* stage an encounter between two modes of representation: the natural history narrative, which presents information about the biology and life history of nonhuman species in a domestic, anthropomorphic wrapping, and the cinematographic image, which presents mimetic yet defamiliarizing views of these species. The former emerges from the British natural history tradition, which dates back to at least the late eighteenth century when Gilbert White's seminal *Natural History and Antiquities of Selborne* was published, and which reached its peak during the Victorian years.¹ The latter stems from new technologies and practices of spectacle that emerged in the late nineteenth century, and can be loosely associated

¹ Thierry Lefebvre has made a similar argument about early French natural history films; his essay "Popularization and Anthropomorphism: On Some Prewar 'Animal Films' (The Scientia Series)" links these early productions to Jean-Henri Fabre's nineteenth-century natural history writing and to the Aesopian fable.

with modernist art. The *Secrets* often resemble modernist painting in their abstract-looking imagery, imagery which estranges rather than domesticates the creatures onscreen. In the *Secrets*, both the natural history narrative and the cinematographic image are deployed to realist ends—they are meant to realistically represent the species under study—but with very different effects. It is the combination of, and tension between, these two kinds of representation that I mean to evoke when I describe the *Secrets of Nature* as “modernist natural history.”

Nature films in the vein of the *Secrets* graphically resemble modernist painting, but they also have a connection to modernist writing about film. Natural history films of the 1920s and 30s speak to the modernist fantasy that cinema is a space beyond human control, a space where contingency rules and nonhuman beings are free to be spontaneous under the watchful, non-intervening eye of the camera. In Virginia Woolf’s words, “We see life as it is when we have no part in it.”² Film, in this fantasy, is a medium that lets leaves flutter in the wind, “unique spectacles of an eddying, free-formed and unpredictable motion.”³ Or in the case of the *Secrets of Nature*, it is a medium that lets animals, plants, and microorganisms move according to their own lights, with some measure of agency in their motion. This utopian strand of film theory is based on film’s indexicality. The camera records what is actually there and thus seemed, to many early writers on film, to bypass the human mind and its perceptions and intentions. With photography, wrote Siegfried Kracauer, “the inert world presents itself in its independence from human beings.”⁴ The idea that any film could be fully independent of human intent is, I think, only a fantasy. But the idea that film could index moments of nonhuman agency finds real

² Woolf, *Essays*, vol. 4, 349.

³ Tom Gunning, “The Attraction of Motion: Modern Representation and the Image of Movement,” 165.

⁴ Siegfried Kracauer, “Photography,” 435.

evidence in the *Secrets of Nature*, as the camera documents creatures in motion without humans pulling the strings.

These links between modernism and the natural history film might seem far-fetched, but there is good historical reason to consider the conjunction. Many natural history and scientific films, including eight of the *Secrets* (*Magic Myxies* among them), were exhibited by the London Film Society, a group formed in 1925 by many of Britain's leading artists and intellectuals. Zoological modernists were well-represented at the Film Society—J.B.S. Haldane, Julian Huxley, and H.G. Wells were among the original members, along with Bloomsburyites Roger Fry and John Maynard Keynes; and Virginia and Leonard Woolf likely attended Film Society shows.⁵ The Film Society screened international and avant-garde works such as *The Cabinet of Dr. Caligari* and *Battleship Potemkin* alongside science and nature films and films from the early days of cinema.⁶ These juxtapositions of different film genres suggest, first, that British modernists watched natural history films, and second, that they may have applied the same viewing habits to natural history films and the avant-garde films with which they shared the program. One Film Society program suggests as much, describing “cut-outs from the *Secrets of Nature* illustrating forms of animal progression” and explaining that while the films “are soundly edited for educational purposes by specialists,” the Film Society will screen only certain selected scenes “for the sake of their pictorial rather than their instructional merit.”⁷ “Pictorial merit” might very well translate to the kind of look that the Film Society members admired in post-Impressionist art and avant-garde film. There is a tantalizing possibility that natural history films

⁵ Laura Marcus, *The Tenth Muse*, 264, 109.

⁶ *Ibid.*, 266.

⁷ *The Film Society Programmes, 1925-1939*, 10.

were experienced, in those audiences, as a training ground for appreciating modernist visual aesthetics, and vice versa.

This chapter explores the modernist natural history of the *Secrets of Nature* in four parts. First, I characterize nineteenth- and early-twentieth-century natural history to show how the *Secrets* appropriate the familiar tropes of their predecessors, primarily (though not exclusively) through the films' narrations and intertitles. Second, I demonstrate the affinities between the defamiliarizing images of the *Secrets* and modernist visual aesthetics. Third, I investigate the modernist fantasy that cinema opens up a nonhuman world, arguing that films like the *Secrets* exemplify this theory of film and add to its vision of contingency the agency of animals. Finally, this chapter considers how the *Secrets* and the genre they represent might contribute to our understanding of modernism and its relationship with the nonhuman, whether animal or machine. In arguing that the *Secrets of Nature* embody a modernist natural history, I am contending that they revamp a natural history tradition that had become overly predictable and ideologically suspect. But I also maintain that they offer a new and clear expression of natural history's long-held commitment to observing and representing other species. Overlapping familiar tropes with defamiliarizing imagery, the films disrupt our normal ways of seeing other creatures, and in that disruption they open a space for apprehending animal difference and agency.

The Natural History Tradition

The term “modernist natural history” may seem like an oxymoron, for natural history is usually regarded as a characteristically Victorian pursuit—pious and respectable and a little stuffy. Lynn Barber dates the “heyday” of natural history as 1820-1870. David Allen Elliston similarly identifies a “malaise” in natural history after Darwin, and quotes one naturalist who

wrote in 1892, “The glory of the field naturalist has departed. The biologist or physiologist is the hero of the hour, and looks down with infinite contempt upon the luckless being who is still content to search for species.”⁸ The usual narrative goes something like this: natural history flourished for many decades in the nineteenth century as a proper, Christian pursuit. But once Darwin discovered natural selection, the study of nature gradually began to be decoupled from theology. Meanwhile, the influence of “Darwin’s Bulldog,” Thomas H. Huxley, helped transform the study of biology and geology into professional scientific disciplines rather than amateur pastimes. By the twentieth century, British children were studying biology in schools, and the idea of natural history as a leisure activity had become passé.

In reality, these reports of natural history’s death were greatly exaggerated. Despite changes in the institutions and practices of biology, natural history remained a popular subject in the twentieth century, not only surviving but also spreading to new media like film and radio. To be sure, new media, along with new cultural contexts, meant that twentieth-century natural history worked differently from its nineteenth-century predecessors in print media. But early nature films, including the *Secrets*, were still a part of the natural history tradition, and it is these continuities that I will demonstrate in this section.

Nineteenth-century natural history is characterized by a tension between two different goals. On the one hand, its practitioners wanted to study nature scientifically and to better understand the workings of plants, animals, rocks, and so on. On the other hand, natural history was saturated with cultural values that were often at odds with discovering scientific explanations for various natural phenomena. Naturalists wanted to tell edifying stories and to improve themselves and others morally. Timothy Boon characterizes nineteenth-century natural

⁸ Allen, *The Naturalist in Britain*, 196; W.B. Grove, “The happy fungus-hunter” (1892), quoted in Allen, *Naturalists and Society*, 366.

history as invested in bucolic and conservative ideas about nature: “Natural history was encouraged variously as fostering a Romantic notion of aesthetics, a stimulant to the growth of reason, a succor to religion and a source of aesthetic pleasure. Amateurs might enjoy natural history as natural theology, to wonder at the beneficence of the Creator, or later at the diversity of the world that natural selection had wrought.”⁹ The study of natural history as natural theology was popularized by William Paley in the early nineteenth century. Paley’s 1802 *Natural Theology* argued that the harmony and functionality in nature were evidence of God’s design.¹⁰ As late as the 1850s and 1860s, this approach to nature study was still going strong. Philip Gosse’s popular books on marine zoology from these decades emphasized that animals’ forms and adaptations were “examples of that Divine economy in creation” and evidence that “every emergency was foreseen and provided for in the mighty plan.”¹¹

Even secular naturalists, such as the skeptic and philosopher G.H. Lewes, associated natural history with moral uplift. In his work on seaside natural history, *Sea-Side Studies* (1858), Lewes rhapsodizes, “In direct contact with Nature we not only learn reverence by having our own insignificance forced upon us, but we learn more and more to appreciate the Infinity on all sides.”¹² Whether that “Infinity” is divine or not, Lewes implies that studying nature can teach us not only about other species, but also about moral values such as reverence and humility. The *Secrets of Nature* retain some hint of this emphasis on the wholesomeness of nature study; the films seem designed to be part of an education in nature appreciation, if not natural theology.

By the 1870s, 80s, and 90s, however, natural history’s moral value began to take a back seat and its entertainment value ratcheted up as new technologies of spectacle became popular.

⁹ Boon, *Films of Fact*, 14-15.

¹⁰ Paley, *Natural Theology*, 12-13.

¹¹ Gosse, *The Aquarium*, 15.

¹² Lewes, *Sea-Side Studies*, 14.

To be sure, visual culture had always been a part of natural history. Most popular natural history books contained illustrations. Jonathan Smith describes, in *Charles Darwin and Victorian Visual Culture*, the nineteenth-century conventions of natural history illustrations, which included birds depicted in front of detailed landscape backgrounds, plants drawn to showcase their anatomical structures, and an overall emphasis on illustrating the features of a species that were necessary for taxonomic classification.¹³ In this focus on selecting the most taxonomically useful poses and compositions, early- and mid-Victorian natural history illustration was aligned with what Lorraine Daston and Peter Galison call the “epistemic virtue” of “truth-to-nature,” the naturalist-illustrator’s ability to select the constant, essential features of species without getting bogged down in the variable, inessential features.¹⁴ Toward the middle of the century, however, accompanied by the spread of photographic technologies, emerged a new epistemic virtue: mechanical objectivity, or the scientist’s duty to capture images of nature unsullied—or at least minimally sullied—by human subjectivity.¹⁵ The technologies we might associate with mechanical objectivity—the photograph, the magic lantern, and later the film—came to play a prominent role in the late-Victorian visual culture of science. (Mechanical objectivity also bears a certain resemblance to modernist theories of film aesthetics, as we will see later in this chapter.)

The late-Victorian visual culture of natural history was distinguished from its predecessors in book illustration not only by its entanglement with the rise of mechanical objectivity, but also by its greater emphasis on spectacle and surprise. Microscope manuals, as Rachel Teukolsky has shown, promised to reveal beautiful microstructures in nature at which

¹³ Smith, 10-16.

¹⁴ Daston and Galison, *Objectivity*, 58-9.

¹⁵ *Ibid.*, 42-3.

viewers could marvel.¹⁶ Public exhibitions magnified these spectacles of living forms even further. Lecturers such as Henry Morton used the magic lantern in popular science demonstrations, projecting slides that contained living insects or microorganisms and even placing an aquarium in the lantern to display the fish, plants, and lizards within.¹⁷ Eadward Muybridge, one of the inventors of the sequential photography techniques that led to motion pictures, toured the United States, Britain, and Europe exhibiting his serial photographs of horses and other animals (including humans) in motion.¹⁸ As Boon argues, “Spectacular shows of living things were evidently a significant component of the entertainment culture of the [Victorian] period.”¹⁹ These popular science exhibitions were an important precursor to cinema, and in particular to natural history films like the *Secrets*.

The first public exhibition of natural history films took place in 1903, at the Alhambra Music Hall in London. This exhibition was a direct antecedent to the *Secrets of Nature*, combining science with entertainment in similar ways. The program was entitled *The Unseen World: Revealing Nature's Closest Secrets by Means of the Urban-Duncan Micro-Bioscope*. Even the rhetoric of “secrets” links the two programs, and emphasizes the surprising unveiling of natural structures that had also appealed to Victorian audiences. The exhibition included films about frog circulation, the freshwater hydra, and chameleons, but its biggest hit was a one-minute film called *Cheese Mites* that presented the tiny mites through a microscope, magnified to

¹⁶ Teukolsky, *The Literate Eye*, 159.

¹⁷ Charles Musser, *The Emergence of Cinema: The American Screen to 1907*, 32. See also Bernard Lightman’s *Victorian Popularizers of Science*, Chapter Four, “The Showmen of Science: Wood, Pepper, and Visual Spectacle,” for an account of two other Victorian lecturers who used visual spectacle in their science demonstrations, the naturalist John George Wood and the director of the Royal Polytechnic John Henry Pepper.

¹⁸ Virgilio Tosi, *Cinema Before Cinema*, 51, 54-59.

¹⁹ Boon, *Films of Fact*, 13.

look like “great uncanny crabs.”²⁰ These first natural history films belong to what Tom Gunning has called the cinema of attractions—they are films from the earliest years of cinema that gratify the audience’s visual curiosity without absorbing them into a story.²¹ Urban’s films, like those of the Lumières, are actualities—nonfictional, and often non-narrative, attractions films. They also borrow techniques from the genre of scientific cinema that Virgilio Tosi has outlined in *Cinema Before Cinema*, most importantly microcinematography and time-lapse photography.²²

The Unseen World inaugurated a tradition of British natural history films, and its producer, Charles Urban, was the most important figure in that tradition until the creation of the *Secrets of Nature* series in 1922. Urban’s company specialized in educational and scientific films. To make his films, he collaborated with Francis Martin Duncan (a photographer and naturalist who later worked for the Zoological Society) and Frank Percy Smith.²³ Smith was, like Duncan, a photographer and naturalist, and after leaving Urban’s company he went on to work on the *Secrets of Nature*. Smith’s films for Urban thus provide an important link between the earliest natural history films and the *Secrets*. Smith made several microcinematographic films, but perhaps his most important work during the Urban years was the 1910 *Birth of a Flower*, which used time-lapse photography to show an accelerated view of a flower’s blossoming. Smith developed these techniques for time-lapse photography and microcinematography further in the

²⁰ Boon, *Films of Fact*, 7-8. The quotation is by Charles Urban.

²¹ Gunning, “The Cinema of Attractions,” 56-59.

²² Tosi, 171-181. Hannah Landecker and Oliver Gaycken have also written about microcinematography and its use in scientific, popular, and educational films in “Microcinematography and the History of Science and Film” and “‘The Swarming of Life’: Moving, Images, Education, and Views through the Microscope.” Gaycken has also explored the history of time-lapse photography and its relationship to botany in “The Secret Life of Plants: Visualizing Vegetative Movement, 1880-1903.”

²³ My history of Urban and Smith’s work is drawn from Boon, 16-32. See also Palle B. Petterson’s *Cameras into the Wild* for descriptions of the work of Urban, Duncan, and Smith (51-57, 91-93, 151-153), and Oliver Gaycken’s forthcoming *Devices of Curiosity: Early Cinema and Popular Science* for an analysis of Smith’s career and work.

Secrets of Nature, and they contribute to what Tom Gunning would call an “aesthetic of astonishment,” encouraging viewers to see the films as technological marvels.²⁴ Oliver Gaycken has argued that Smith’s work for Urban developed the traditions of popular science while also playing on an aesthetic of novelty and curiosity; and these two aims also characterize Smith’s later work for the *Secrets of Nature*.²⁵

In the 1910s and 20s, nature films began to diverge in two different directions: the wildlife film, and what I am calling the natural history film. The wildlife film, a primarily (though not exclusively) American genre, evolved highly-conventionalized codes of representation, codes that Derek Bousé, Gregg Mitman, and Cynthia Chris have described in their books.²⁶ Safari and hunting films such as William Selig’s *Hunting Big Game in Africa* (1909), Paul Rainey’s *African Hunt* (1912), and Martin and Osa Johnson’s *Simba* (1928), which featured sensationalized violence and ethnographic images of “natives,” inaugurated the wildlife film genre.²⁷ The natural history film, on the other hand, tended (with a few exceptions) to eschew sensationalistic violence, preferred ordinary local species to exotic megafauna, and was less associated with hunting; some of the *Secrets*, such as *The White Owl*, even express an anti-hunting sentiment.

Unlike wildlife films, which tend to revolve around large mammals such as lions, tigers, and bears, the *Secrets of Nature* highlight fairly common British species—owls, ants, bees, peas,

²⁴ Gunning, “An Aesthetic of Astonishment: Early Film and the (In)Credulous Spectator.” In this essay, Gunning describes the responses of early film viewers (particularly in the first ten years of cinema) as astonishment at what they understood was the *illusion* of reality. These viewers’ experience testifies to “an undisguised awareness (and delight in) film’s illusionistic capabilities [*sic*]” (129). Smith’s techniques, which create the illusion of microorganisms made giant or animated flowers, elicit a similar pleasure in viewers.

²⁵ Gaycken, *Devices of Curiosity* (forthcoming).

²⁶ See Bousé’s *Wildlife Films*, Mitman’s *Reel Nature*, and Chris’s *Watching Wildlife*.

²⁷ Mitman, 9-10, 18-20; Chris, 16-17.

moss, even the molds that grow in pantries and the pests that feed in gardens.²⁸ The emphasis is on noticing the domestic species that are so common we overlook them, and seeing these common species in a new way. In focusing on the more ordinary aspects of nature, the *Secrets* belong less to the tradition of the traveling naturalist (perhaps exemplified by Darwin's work in South America, or Alfred Russel Wallace's in Malaysia) and more to the tradition of documenting the natural history of one's own county (exemplified by Gilbert White's work in Selborne, or Darwin's at Down House in Kent). By focusing on species that even an urban viewer could see "in the wild," the *Secrets* play on the same sense of amateur do-it-yourself-ism that led proper Victorian ladies and respectable clergymen out of their drawing rooms and into the haunts of birds, shellfish, and butterflies.²⁹ This valuation of the domestic is common to many Victorian naturalists, but perhaps none so much as Darwin, of whom Jonathan Smith writes, "a trademark of Darwin's science [is] a close examination of the small, the domestic, and the familiar that leads to the revelation not just of their strangeness but of their importance to basic understandings of the natural world."³⁰ The films, too, work to spark a sense of wonder in the domestic and the ordinary.

This focus on everyday species is important because it runs contrary to common theories about animals in modernity. John Berger, in "Why Look at Animals?" argues that modernity is

²⁸ Bousé emphasizes the importance of megafauna—"big cats, bears, sharks, crocodiles, elephants, whales, and the like—to the wildlife film genre, describing it as one of the seven defining characteristics of "blue chip" wildlife films (14). It is notable, then, that the *Secrets* deviate from this code; indeed, this is perhaps the largest difference between wildlife and natural history films.

²⁹ Lynn Barber describes how the proponents of natural history frequently touted it as a way for the leisure classes to spice up otherwise-boring daily walks in the countryside (*The Heyday of Natural History, 1820-1870*, 19-20).

³⁰ Smith, *Charles Darwin and Victorian Visual Culture*, 51.

marked by “the disappearance of animals from everyday life.”³¹ In the nineteenth century, as Western economies transitioned from agricultural to urban-industrial models, Berger argues that animals were rendered marginal, relegated to zoos and diminished through consumer culture. Following Berger, Akira Mizuta Lippit has also associated the rise of the cinematographic, “electric” animal with the disappearance of actual animals.³² There is no disputing that modernity has witnessed a growing distance between urban consumers and the farm animals they might, decades or centuries earlier, have lived with, nor that modernity has contributed to the extinction of individual animals and entire species through habitat loss and ecological destruction. Nevertheless, I would argue that the disappearing animal thesis overstates its case. Animals have only “vanished” from everyday life if we exclude pets, insects, common birds, and other urban creatures—the kind of species that Donna Haraway has rebranded as “companion species.”³³ When the *Secrets of Nature* present to viewers species that seem ordinary, even insignificant, they signal that film can do more than just serve as a memento mori for animals; it can also allow viewers to see the species with which they share an immediate environment in a new light.

There is another form of domestication present in the *Secrets*, and in the natural history tradition: the anthropomorphic family values narrative. Lynn Barber describes the anthropomorphic strains of Victorian natural history as follows: “Birds are almost invariably referred to as ‘feathered songsters’, their courtship as ‘mutual caresses’, their nest-building as ‘home-making’ and their eggs as ‘the dear fruits of happy love’. Each animal is given a

³¹ Berger, *About Looking*, 19.

³² Lippit, *Electric Animal*.

³³ See Haraway, *When Species Meet*, for her critical response to the kind of animal studies that dismisses pets as animals that are uninteresting philosophically (28-30).

‘character’ which is presented with no whit less certitude than its appearance.”³⁴ Many popular natural histories projected human values, especially the values of family and of cooperative labor, onto the animal kingdom. Not even Darwin was immune to these domestic tropes; in describing his barnacles, for example, he wrote that each female barnacle kept “a little husband” in each of her “pockets.”³⁵ Cooperation and industry were also highly praised when found in the natural world. John Ruskin, for example, noting the interdependence of different parts of a plant, declared this evidence of a “Law of Help” that applied equally to organic bodies and to art.³⁶ Charles Kingsley similarly insisted that cooperation, rather than competition, was the norm in nature—and, one might assume, ought also to be the norm in human society.³⁷

Many of the intertitles and narrations of the *Secrets of Nature* films draw heavily on this moralizing anthropomorphic discourse. *Romance in a Pond* dramatizes the courtship of newts, calling the males and females “gentlemen” and “ladies” and referring to the pond as their “honeymoon home.” *The Nursery of the Cormorant*, presenting the female cormorant, narrates “‘the old, old story’: on a ledge below she patiently awaits the coming of a mate.” Like courtship, family life also gets the anthropomorphic treatment. The cuckoo of *The Cuckoo’s Secret* is censured as a “home-wrecker” for interfering with the domestic lives of other bird families, while the more respectable great crested grebe in *The Bittern* “makes her island nursery” and “settles down to the business of bringing up a family while her mate collects fresh material for decorating the home.” *Roger the Raven* offers particularly blatant examples of an ideologically-loaded family narrative, as the narrator jokes about the female raven, “A woman’s work is never done” and “No girl can keep her glamor while she’s sitting on eggs.” These

³⁴ Barber, *The Heyday of Natural History, 1820-1870*, 19.

³⁵ Quoted in Rebecca Stott, *Darwin and the Barnacle*, 132.

³⁶ Ruskin, *Modern Painters V*, 163-9.

³⁷ Allen, *The Naturalist in Britain*, 201.

descriptions draw on old-fashioned gender roles—females may be either doting mothers or home-wreckers, while males venture into the outside world to collect resources for the family, just like any good middle-class patriarch. The films thus provide a perfect example of the naturalization of gender roles in Western science that has been critiqued by feminist scholars.³⁸

Other *Secrets* expand their anthropomorphic projections from the family structure to larger social structures. The anthropomorphism is especially heavy-handed in a film like *The Battle of the Ants*, in which an extended metaphor describes ants of different colonies as “spies,” “scouts,” “invaders,” and “enemies,” while the nest became a “battlefield” and a piece of timber a “busy highway.” The ants are portrayed as masculine warriors in organized armies (even though ant “soldiers” are biologically female), while the queen becomes a “spoil of war” to be carried off by the victors. A film like *Floral Co-operative Societies*, on the other hand, identifies not competition but cooperation in nature. The title derives from the film’s focus on composite flowers, plants in which a multitude of florets combine to create the illusion of a single large flower. The film’s central conceit is that composite flowers divide their florets into “advertisers,” the large colorful sections that attract pollinating insects, and “workers,” the sections that produce pollen and seeds. The filmmakers cannot resist, however, overplaying this moralizing message about the division of labor. According to one intertitle, “In a natural flower, the number of ‘Advertisers’ and ‘Workers’ is in proportion.” But “Man’s cultivation of petals at the expense of the seed-head produces a gigantic bluff—a society of ‘Advertisers’ without a single ‘Worker.’”

³⁸ See Suzanne Le-May Sheffield’s *Women and Science: Social Impact and Interaction*, pp. 50-55, for a bibliographic essay on the naturalization of gender roles in science. Key texts critiquing this naturalization from a feminist perspective include Donna Haraway’s *Primate Visions* (1989), Londa Schiebinger’s *Nature’s Body: Gender in the Making of Modern Science* (1993), Emily Martin’s “The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles” (1991), and Anne Fausto-Sterling’s *Myths of Gender: Biological Theories about Women and Men* (1985).

Thus, the film not only models its narrative of composite flowers on capitalist industry; it also seems to pass some kind of moral judgment about “man’s” taste for “advertisement,” or surface appearances, over labor.

It may be apparent by now that many of the *Secrets* devote more attention to value-laden metaphors and cute narratives than to actual science; and indeed, for every film that attempts to teach audiences about the life cycle, feeding habits, or social behavior of a species, there is another that values entertainment at the expense of education, or even accuracy. Yet this, too, is typical of natural history as a genre. Barber drily observes, “While the prefaces of Victorian natural history books invariably stress the deep seriousness and usefulness of the study, the texts themselves concentrated on making the subject as light and amusing as possible, often by jettisoning any pretence to accuracy. It is by no means rare to find whales included among fishes, or spiders among insects.”³⁹ Natural history lacked the systematic processes of replicating experimental results and peer-reviewing claims that institutional biology would develop. As a result, second-hand anecdotes were often presented as fact, and common myths as truth.

Although these scientific infelicities may have been common practice in natural history, the ones in the *Secrets of Nature* nevertheless drew criticism. Jan Faull notes that despite the films’ popularity, “contemporary reviews displayed some dismissal of the scientific value of the films, largely due to the perceived levity of the commentary in the later sound films.”⁴⁰ She cites critics who complained of *The Strangler* (a film about a parasitic plant called the dodder), “[T]he accompanying commentary...is unsuited either to an educated or to an about-to-be-educated audience,” and declared of *Romance in a Pond*, “The spoken commentary is literally

³⁹ Barber, 18.

⁴⁰ Faull, “Secrets Revealed,” in *Secrets of Nature: Pioneering Natural History Films* (DVD booklet), 35.

exasperating and revolting.”⁴¹ One particularly egregious example of this “jettisoning any pretence to accuracy” in the *Secrets* occurs in *Magic Myxies*, as the narrator blithely declares that “part of their lives, [the myxies] are vegetables, and part of their lives, they are animals.” They are actually neither; myxomycetes are now classified as protists. Even in 1931, however, the claim that these creatures could transform from plants to animals was ridiculed in the *Monthly Film Bulletin* for its scientific inaccuracy.⁴² Julian Huxley, in an otherwise positive review of Mary Field and Percy Smith’s book *Secrets of Nature* (an account of the filmmaking process) complains that for the public, “[t]he cruelties of nature, instead of being viewed philosophically, are invested with the mentality of the spectator and call forth reprobation or disgust (this fallacy, by the way, is not always eschewed by our authors, who imply severe condemnation of the parasitic habits of the dodder and the cuckoo!).”⁴³ He might have made the same critique of a film like *Tragedy of the Sea*, a miniature morality play that casts one spider crab as a “villain” for fighting another crab over food. The *Secrets*’ unscientific outlook and laxity about scientific accuracy does not set them apart from other works of natural history; but critics’ reaction to it reveals that many viewers wanted an informal kind of science education from the films, and disliked the films’ feeble attempts to leaven the facts with humor and sentiment.⁴⁴

Despite these shortcomings, films like *Magic Myxies* appealed to critics because of the

⁴¹ Ibid., 35. The quotations are from the *Monthly Film Bulletin* in, respectively, June 1937 and November 1936.

⁴² *Secrets of Nature: Pioneering Natural History Films* (DVD booklet), 9.

⁴³ Huxley, “*Secrets of Nature* [review],” 120.

⁴⁴ Despite these shortcomings, natural history films such as the *Secrets* were considered educational, especially for schoolchildren. Julian Huxley showed two of the *Secrets* to Kenyan schoolchildren in 1929, and wrote about the films’ educational value (Boon, “The Techniques” 6; Huxley, “Young Africa and the Cinema”). Jennifer Peterson’s essay “Glimpses of Animal Life: Nature Films and the Emergence of Classroom Cinema” discusses the use of natural history films in 1920s and 30s classrooms, noting that many nature films were expressly made for schoolchildren and that they, like the *Secrets*, combined educational and entertainment goals.

cinematography; the images captured by Percy Smith's camera were often surprising and sometimes even beautiful. Jonathan Burt characterizes Smith's aesthetic as one "that played on the surprise of the ordinary and reflected the local accessibility of the natural world. It was also an aesthetic that rejected the violence of much nature imagery and celebrated the underdog: [Smith said] 'if I think anything is a pest I make a film about it; then it becomes beautiful.'"⁴⁵ The way that the *Secrets of Nature* developed this sense of surprise and wonder at animals and plants, as I will show, was through the same strategies of defamiliarization and abstraction that characterized modernist visual aesthetics.

Modernist Aesthetics in the *Secrets of Nature*

It may seem paradoxical to suggest that natural history films could have anything to do with modernist aesthetics because they have such different objectives. Modernist art consists of many different schools and styles, but it is usually characterized as a movement away from mimesis and nature, toward abstraction and artifice. The angular geometries of Cubism and the high-contrast shapes of Kandinsky seem to have little in common with the natural history film's mimetic biological images. Natural history films would seem to be irreconcilable with this increasing abstraction in art because the purpose of the films is fundamentally realist—to show audiences the life forms that actually exist in the world. Short of novel editing patterns or experimental narrative structures, then, there seems to be little opportunity for natural history films to engage in a modernist aesthetic project.

Yet a few film critics have argued that science and nature films, in particular the works of French filmmaker Jean Painlevé and Dutch filmmaker J.C. Mol, share an aesthetic with avant-

⁴⁵ Burt, *Animals in Film*, 129.

garde films.⁴⁶ This chapter builds on that work by arguing that there is a modernist sensibility to many of the images in the *Secrets of Nature*, one that extends beyond and often contrasts with the films' editing and narrative structures. The *Secrets* share with modernist art and literature an aesthetic of defamiliarization, uncanniness, and hypermediacy. In the microorganism films, myxies and infusoria call to mind the flatness and abstract forms that we see in modernist paintings. The paramecia of *The World in a Wine-glass*, for example, graphically resemble the squiggles of Paul Klee's late works.⁴⁷ Even without the extreme magnification of the microscope, the plant and insect films showcase organisms abstracted from their normal environments, fragmented by the frame, and magnified to larger-than-life proportions; these images achieve the defamiliarizing effects of George O'Keeffe's plant paintings. Many of the *Secrets* also share with modernist art an emphasis on the medium—the images promise an immediate view of other species, but with a blink they become instead abstract patterns of light and dark across a screen, markers of the medium of cinema itself. Aesthetic appreciation had always been a part of natural history, but only in the era of cinema and modernism could this aesthetics of defamiliarization, uncanniness, and hypermediacy become an integral part of a practice as old-fashioned as the study of nature.

⁴⁶ The Film Society screened films by both Painlevé and Mol in the 1930s (*The Film Society Programmes* 356, 380, 388). Painlevé's films are often associated with Surrealism; see Brigitte Berg, "Contradictory Forces: Jean Painlevé, 1902-1989" (12). Malin Wahlberg argues that science films, particular those of J.C. Mol, need to be understood within the context of avant-garde cinema and its aesthetics of "space-time abstraction" and "visualized rhythm" ("Wonders of Cinematic Abstraction: J.C. Mol and the Aesthetic Experience of Science Film" 274). I share Wahlberg's conviction that aesthetic experience is an important component of science films, but I want to consider this aesthetic experience within a broader context of modernist aesthetics, rather than within the particular context of avant-garde film.

⁴⁷ See, for example, *After the Flood* (1936), *Boats in the Flood Waters* (1937), and *Blades* (1938), which include the characteristic Klee squiggles that recall the appearance of infusoria moving and twisting under the microscope.

Defamiliarization is itself a modernist concept, invented by the Russian Formalist Viktor Shklovsky in 1917. In the essay “Art as Technique,” Shklovsky argues that art works against the automatism of everyday, habitual perception. “The technique of art,” he writes, “is to make objects ‘unfamiliar,’ to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged.”⁴⁸ Defamiliarization is a way of seeing anew “the artfulness of an object.”⁴⁹ The microscope defamiliarizes ordinary matter—put a droplet of pond water on the slide, as the filmmakers do in *The World in a Wine-glass*, and the teeming life that the microscope makes visible transforms this drop into something strange. Other characteristics of the *Secrets*’ modernist aesthetics—flattening, magnification, a non-naturalistic black-and-white color scheme—work similarly to jolt viewers out of their ordinary patterns of perception. The uncanny is perhaps the converse of defamiliarization—Freud describes it as a form of aesthetic experience in which something novel “leads back to what is known of old and long familiar.”⁵⁰ While defamiliarization makes the familiar seem strange, the uncanny makes the strange seem eerily familiar. For example, the underwater landscapes of the film *Fathoms Deep Beneath the Sea* bear an uncanny resemblance to photo negatives of terrestrial landscapes, the sea anemones standing in for mushrooms or flowers (Fig. 5). Despite their differences, defamiliarization and uncanniness are both aesthetic experiences that foreground an unsettling intimacy between the ordinary and the strange.

⁴⁸ Shklovsky, “Art as Technique,” 12.

⁴⁹ *Ibid.*, 12.

⁵⁰ Sigmund Freud, “The Uncanny,” 220.



Figure 5

Modernist art and literature value not only defamiliarization and uncanniness, but also hypermediacy, which Jay David Bolter and Richard Grusin define as “[a] style of visual representation whose goal is to remind the viewer of the medium.”⁵¹ Bolter and Grusin argue that hypermediacy and immediacy are the twin logics of new media; on one hand, media technologies promise immersive, transparent access to reality, and on the other hand they celebrate technological mediation itself. Early film, for example, impressed audiences both because its images seemed so *real* and because viewers were enthralled by the new medium that could make such realistic moving images.⁵² Bolter and Grusin argue that this oscillation between immediacy and hypermediacy was characteristic not just of early film but also of “collage,

⁵¹ Jay David Bolter and Richard Grusin, *Remediation*, 272.

⁵² *Ibid.*, 155.

photomontage, and elite modern art in general.”⁵³ One might add to this list Imagist poetry, which insisted on transparent images, “hard and clear,” but also required language “in sequence of the musical phrase,” an art of words.⁵⁴ According to Clement Greenberg, “Realistic, naturalistic art had dissembled the medium, using art to conceal art; Modernism used art to call attention to art.”⁵⁵ The *Secrets of Nature* reflect both logics; promising immediate visual access to nature’s “secrets,” they often instead uncover their own cinematic mediation.

The modernist aesthetics of microscopic life have been apparent to critics and commentators since the heyday of modernism itself. Walter Benjamin wrote that “new painters like Klee and even more Kandinsky have long been at work establishing friendly relations between us and the realms into which the microscope would like to seduce us.”⁵⁶ In a 1961 essay, Aldous Huxley noted the resemblance between the “micro-photographic universe, in which there are no solids and no distances,” and “the universe of the Abstract Expressionist.” He claims that this is no coincidence: “Seeking the essences of things, contemporary artists have turned, not unnaturally, to the images of reality furnished by modern technology in the service of science.”⁵⁷ More recently, film critics Standish D. Lawder, Lisa Cartwright, and Emily Godbey have picked up this thread; Godbey observes that “the new unfamiliar bacterial universe depicted by Pathé and [Charles] Urban might have become the moving shapes reminiscent of innovative paintings without the explanations of subtitles or lecture.”⁵⁸ The *Secrets of Nature* furnish apt

⁵³ Ibid., 155.

⁵⁴ Amy Lowell, “Preface,” vii; Ezra Pound, “From *A Retrospect*,” 294.

⁵⁵ Greenberg, “Modernist Painting,” 86.

⁵⁶ Walter Benjamin, “News About Flowers,” 156.

⁵⁷ Aldous Huxley, “Science, Technology, and Beauty,” 89.

⁵⁸ Godbey, “The Cinema of (Un)Attractions: Microscopic Objects on Screen,” 281. See also Standish D. Lawder’s *The Cubist Cinema* (14) and Lisa Cartwright’s *Screening the Body* (91), which link microcinematography to Kandinsky and Cubist painters, respectively.

evidence for these readings, revealing how microcinematography produces images of flattened, abstract, and uncanny forms.

The World in a Wine-glass operates according to these aesthetic conventions, and also foregrounds the artificiality of its operations. The film is about infusoria—tiny freshwater creatures, mostly single-celled protists. These “animalcules” can be found, according to the filmmakers, “living naturally in ponds and streams, pools and puddles,” but the film situates them in the more contained environment of a homemade aquarium.⁵⁹ Instructing viewers to put a piece of hay in a glass of water, the narrator declares, “In a few days, if you look through a microscope, you will find your aquarium in full swing.” The film thus highlights the layers of mediation that occur between the microorganisms and the viewers—the home laboratory setting and the microscope technology, and indirectly the cinematographic apparatus, which make our encounter with the infusoria possible. This is not a film about unmediated nature, but instead a celebration of technological artifice and microcinematographic media.

The flip side of this scientific artifice is the film’s aestheticization of the scientific gaze and the creatures under the microscope. The narrator describes the infusoria as beautiful forms. He calls all of the infusoria by their common names, which usually refer to the organisms’ shapes. There are “slippers” (*Paramecia*), “purses” (*Bursaria*), “trumpets” (*Stentor*), and “bells” (*Vorticella*), just to name a few. The filmmakers, of course, did not invent these common names, but their use of them does more than just reflect a desire to avoid too-technical terminology—it also sets up a particular way of looking at the “animalcules.” They, like the shapes of Kandinsky and Klee paintings, are pictorial abstractions that evoke but do not represent various familiar objects. The narrator also aestheticizes the infusoria in more direct ways. He compares a colony

⁵⁹ J.V. Durden, Mary Field, and F. Percy Smith, *Cine-Biology*, 27.

of bells to “a spray of white heather coming to life,” declaring them “so lovely as they furl and unfurl.” The comparison highlights the uncanniness of the image—as with the “slippers,” “purses,” and so on, the bells graphically resemble yet are also very different from the familiar heather. We might look appreciatively at the bells in the same way as Victorian naturalists looked at ferns or flowers, but their movements against the artificially blank background remind us that we are seeing a much more alien life form through a much more technologically-mediated lens.

The infusoria generally appear in high-contrast images, where they are white, sometimes translucent forms against a black background. The abstraction of these organisms from their environment is probably as much an effect of the microscope as a deliberate choice, but it still has the effect of making the creatures seem to float freely in empty space. In Figure 6, a colony of bells look like smudges of white paint on a black canvas, visually echoing the visible brush strokes of Impressionist and Post-Impressionist painters. As in some modernist painting, the illusion of three-dimensional space is replaced by a flattened scene, with little or no pretense of illusionistic depth.⁶⁰ The camera necessarily records three-dimensional reality as a two-dimensional image, but in the microorganism films this flattening effect is particularly pronounced, doubled by the flattening tendency of the microscope.

⁶⁰ Clement Greenberg has emphasized the importance of flatness for modern art in the essay “Modernist Painting.” Though he sees flatness as a quality peculiar to painting, I would argue that it is also characteristic of film.

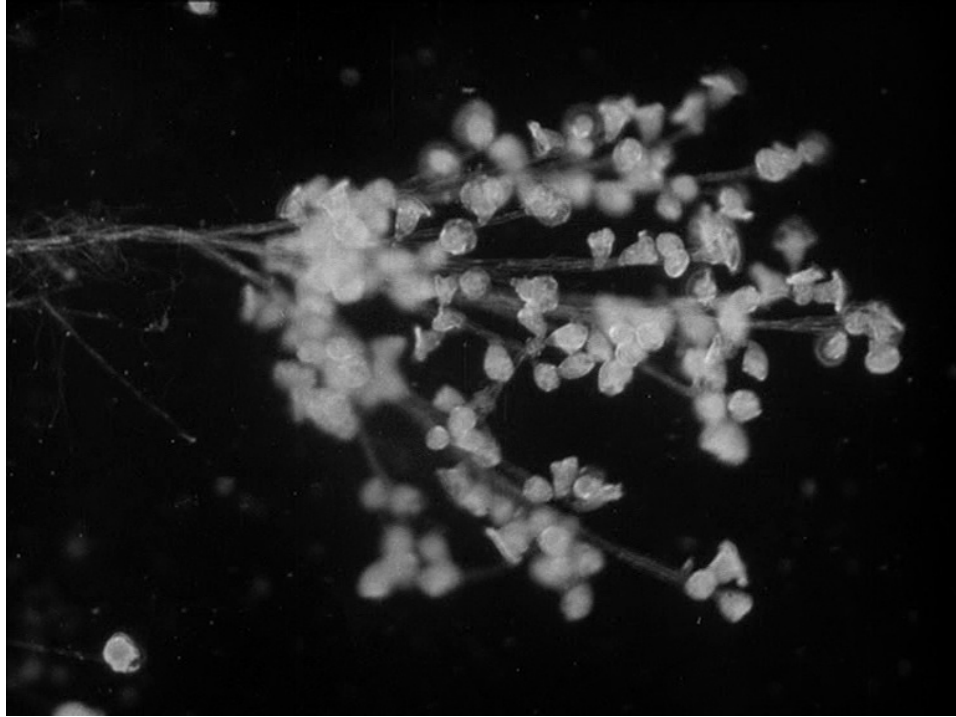


Figure 6

Walter Benjamin preferred to the microscope a less extreme scale of magnification. In his essay “News About Flowers,” he praises the plant photographs of Karl Blossfeldt, which enlarge plant parts in order to showcase the strange and beautiful forms that are usually overlooked. This essay is notable for an early articulation of what would come to be the concept of the “optical unconscious.” Blossfeldt has, according to Benjamin, “done more than his share of that great stock-taking of the inventory of human perception that will alter our image of the world in as yet unforeseen ways... [A] geyser of new image-worlds hisses up at points in our existence where we would have least thought them possible.”⁶¹ Photographic enlargement creates, in Blossfeldt’s photographs, evocative modernist forms:

[W]e... encounter in these enlarged plants vegetal ‘Forms of Style.’ One senses a gothic *parti pris* in the bishop’s staff which an ostrich fern represents, in the larkspur, and in the

⁶¹ Benjamin, “News About Flowers,” 155-156.

blossom of the saxifrage, which also does honor to its name in cathedrals as a rose window which breaks through the wall. The oldest forms of columns pop up in horsetails; totem poles appear in chestnut and maple shoots enlarged ten times; and the shoots of a monk's-hood unfold like the body of a gifted dancer.⁶²

Although Blossfeldt takes pictures of ordinary plants—ferns, larkspurs, maples—his photographs emphasize not their familiarity as plants but instead their uncanny forms, which usually go unnoticed. The veins of leaves and stems of ferns, under magnification, become abstracted from their original context as parts of plants. And when they are distanced from their “real” existence and function as plant parts, Benjamin can project onto them familiar human architectural and artistic forms.

Benjamin celebrates Blossfeldt's photos for changing our ordinary patterns of perception, and we can see similar effects at work in Georgia O'Keeffe's paintings of zoological and botanical objects. In the 1938 painting *Red Hill and White Shell*, O'Keeffe paints a seashell as enormous against a red, amorphous background. Though the seashell is still recognizable as such, it is also abstract enough to invite a focus not on what it represents, but on its spiral pattern and grooved texture. In a painting like *The Lawrence Tree* (1929, Fig. 7), meanwhile, the combination of flattened colors and an unusual angle defamiliarizes what we know to be a tree. The branches begin to look like tentacles, the leaves an inky cloud. Though the tree is still recognizable as such, it is also abstract enough to recall other objects of similar shapes and colors. As Marianna Torgovnick writes, O'Keeffe's images “render natural forms or simple man-made shapes in startling scales and from unusual angles that cause objects to lose their familiarity and become strange.”⁶³ O'Keeffe's paintings, like Blossfeldt's photographs and some

⁶² Ibid., 156.

⁶³ Torgovnick, *Primitive Passions*, 114-15. O'Keeffe is perhaps most famous for her flower paintings, which are frequently noted for their resemblance to female genitalia. O'Keeffe resisted this interpretation of her work, however, perhaps because it oversimplified the effect of the

of the *Secrets of Nature* films, show that a microscope is not required to reveal the strangeness of familiar natural objects. A more modest change in scale, angle, or color can accomplish the same effect.



Figure 7

Like Blossfeldt and O’Keeffe, the *Secrets of Nature* filmmakers play with scale and perspective to create surprising aesthetic and cognitive effects. In *Skilled Insect Artisans*, for example, close-up shots transform tiny caterpillars and butterflies into larger-than-life animals (Fig. 8). The change in scale forces a change in our perspective—we are suddenly seeing the world that a creature thousands of times smaller than ourselves inhabits. Leaves and stems

paintings. It is not that the flowers “represent” genitalia in any one-to-one correspondence; rather, as artists like O’Keeffe paint natural forms in increasingly abstract ways, all such forms become uncannily evocative of other objects.

become fragmented forms of light and dark; insect bodies, spotlighted, appear in greater detail; and the creatures' surroundings, which would normally occupy most of our attention, become an opaque black background. The camera makes visible an insect world that exists beyond our everyday perceptions, the optical unconscious of our ordinary human world.



Figure 8

In *The Aphis*, many different modernist effects come together as magnification and high-contrast lighting create images that are abstract-looking, defamiliarizing, and hypermediated. One shot, spotlighting a young aphis as “he” “kicks off his first coat of membrane,” is especially high-contrast (Fig. 9). Like the images in *The World in a Wine-glass*, this still resembles a photo negative with its brightly-lit subject and inky-black background. The white form of the aphis loses all texture, detail, and three-dimensionality, abstracted into a silhouette. This artificial

appearance reminds us of the technological production of the image. A pattern of light and dark, it loses its referentiality and becomes an emblem of film itself, which is always, mimetic functions notwithstanding, a pattern of light and dark.



Figure 9

This image of the aphis is not really a still image, of course, but a moving one. One of cinema's most vaunted contributions to modernist art is the celebration of motion; the Italian Futurists, noted fans of cinema, declared, "[A]ll things move, all things run, all things are rapidly changing."⁶⁴ The aphis of this film becomes, with its rapidly-moving legs and antennae, a testament to film's ability to make movement fascinating. Tom Gunning has written about the power of movement in early attractions films, arguing in "The Attraction of Motion" that film

⁶⁴ Umberto Boccioni et al., "Futurist Painting: Technical Manifesto," 64.

theory and history need to recover a sense of the importance of “*kinesis*” in cinema. “[T]he subjection of movement to narrative purposes may well form an important aspect of film history,” he admits, “but by no means constitutes an essential part of the phenomenology of the film image.”⁶⁵ Early film audiences, he suggests, were much more attuned to the importance of motion itself than are most contemporary film scholars. In this particular film the inhuman *Aphis*, a strange, faceless creature, testifies with its quivering and busily-moving appendages to film’s capacity to capture pure, unnarrativized motion. It recalls attractions films such as the serpentine dances of Loie Fuller, which Gunning claims “clearly show the inspiration such a spectacle must have provided for a future abstract art of pure form and colour endowed with an appearance of mutability.”⁶⁶ *The Aphis*, then, exemplifies an especially energetic and dynamic kind of modernist formalism.

I have been focusing on the composition of individual shots in the *Secrets of Nature*, but there are also moments in which editing techniques, or the appearance of them, contribute to the films’ aesthetic effects. These moments exhibit an ambiguity between artifice and “nature” that denaturalizes creaturely motions. For instance, *Skilled Insect Artisans* frequently employs jump cuts to demonstrate changes that happen over long periods of time. When the butterfly emerges from its cocoon, its wings are tiny and soft, and take about half an hour to grow to their full size (a fact to which an intertitle alerts us). Rather than using a more-evenly paced time-lapse technique to show the growth of the wings, the film cuts from phase to phase in the process. At one point, however, the editing becomes ambiguous. An intertitle announces that the red

⁶⁵ Gunning, “The Attraction of Motion: Modern Representation and the Image of Movement,” 165-6. Oliver Gaycken also writes about the importance of motion in natural history films as an educational device; see ““The Swarming of Life’: Moving Images, Education, and Views through the Microscope.”

⁶⁶ Gunning, “An Aesthetic of Astonishment,” 167.

admiral's husk splits and the butterfly emerges. The following images show closed husks, then split husks. There has been a jump cut, but the impression is that the husks have split quite suddenly. The inverse situation occurs in *The Ant-Lion* and *The World in a Wine-glass*, in which "natural" motions conjure up editing techniques. *The Ant-Lion* features an insect species which "has the marked peculiarity of only moving on by moving backwards"; its ordinary locomotion looks like a film played backwards. *The World in a Wine-glass*, meanwhile, presents the bell animalcules, which attach themselves to a stationary surface, like a piece of hay, with a contractile stalk. The film shows a colony of bells swaying and moving, a shot punctuated by very rapid changes of position. These punctuations look like jump cuts, but are probably real-time contractions of the bells' springy stalks.

These moments seem reminiscent of the editing in a Georges Méliès trick film. Méliès, in films like *The Magician* (1898) and *The Conjuror* (1899), used jump cuts to simulate magical events such as the sudden appearance and disappearance of objects and people; the *Secrets*, meanwhile, use editing techniques to simulate natural movements and record natural movements that look like editing techniques. The technological magic of cinema and the surprising motions of other species become indistinguishable. These moments of ambiguity point to a deeper parallel between creaturely and cinematic movements, a connection that the next section explores.

Animal Movement and the Film Medium

The animals in the *Secrets of Nature* films appear as modernist aesthetic objects, but they are more than that; they are also subjects, moving and acting before a camera in often-unpredictable ways. Their motions illuminate a strand of modernist film theory that celebrates

cinema as fostering nature's contingency and considers nature films as cinema par excellence. They also show us how to revise this critical tradition by recasting "nature's contingency" as "animal agency." Early film theorists were entranced by film as a medium—by its mechanical recording of reality, which seemed to operate independently of the human cinematographer. Film seemed to them to offer a special access to nature unsullied by human subjectivity. Cinema, in short, was a medium that let nonhuman nature speak.

In fact, many early film theorists felt that the natural history film was the exemplary form of film as a medium. Hannah Landecker has shown how early film theorists, from Walter Benjamin to Siegfried Kracauer to Germaine Dulac, were influenced by microcinematographic science films, which seemed to offer them a window onto the essence of film itself.⁶⁷ But it was not just microcinematography that inspired these thinkers; films of larger life forms also seemed to express the possibilities of cinema, and cinema seemed a necessary intermediary to appreciate the essence of those life forms. As French filmmaker and critic Jean Epstein wrote, "If we wish to understand how an animal, a plant, or a stone can inspire respect, fear, or horror, those three most sacred sentiments, I think we must watch them on the screen, living their mysterious, silent lives, alien to the human sensibility."⁶⁸ To the British critic Huntly Carter, invoking the *Secrets of Nature*, "[T]he only form of art expression... that rightly belongs to the Cinema is that of the natural aesthetic of an object as when a spider weaves a web out of itself, or, as The Secret of Nature [sic] picture natural objects unfold and clothe themselves in their own aesthetic, through the exercise of the power of art expression inhering in themselves."⁶⁹ André Bazin put the case

⁶⁷ Hannah Landecker, "Cellular Features: Microcinematography and Film Theory." See also James Leo Cahill's "Horse d'oeuvre: Science, the Short Film, and *The Perception of Life*" (68), which briefly discusses science film's influence on early film theory.

⁶⁸ Jean Epstein, "On Certain Characteristics of *Photogénie*," 317.

⁶⁹ Huntly Carter, *The New Spirit in the Cinema*, 277-278.

even more strongly in 1947, writing that in science films, cinema reaches its “purest aesthetic.” “The camera alone possesses the secret key to this universe where supreme beauty is identified at once with nature and chance,” he writes.⁷⁰ For Bazin, it is the camera that acts, that unlocks and reveals nature’s “accidental beauty.” Carter shares Bazin’s aesthetic appreciation for the nature film, but his syntax gives agency to the spider and the “natural objects,” rather than the camera alone. In natural history films, the camera’s mechanical agency and the animals’ agency in motion parallel one another. Together, they offer an alternative to human artistic creation which many modernist writers and commentators found compelling.

To understand the roots of early film theory’s fascination with the natural history film, we can turn to David Trotter, who argues, in *Cinema and Modernism*, that the most important link between modernist writing and cinema is not the writers’ use of “cinematic” style—literary techniques that resemble montage, tracking shots, close-ups, and so on—but instead their fascination with the neutrality of film as a medium. The camera, at least in principle, is an inhuman recording mechanism, admitting no intervening human subject when recording reality. Film as an art, of course, is anything but neutral. Yet even as the narrative and ideological conventions of film were being codified throughout the early twentieth century, modernist writers and film theorists remained entranced by the idea of film as a neutral record of reality. We might even say that the modernist attraction to the automatic, impersonal quality of film as a medium is the artistic corollary of what Daston and Galison call mechanical objectivity in the sciences. Writers, like scientists, wanted make records of reality with as little subjectivity infused into them as possible, and photographic technologies (including film) seemed perfect for such a task.

⁷⁰ André Bazin, “Science Film: Accidental Beauty,” 146.

Siegfried Kracauer, one of the most important modernist film theorists, placed great importance on the indexical recording of reality in photography and film (indeed, his *Theory of Film* is subtitled *The Redemption of Physical Reality*). The camera's mechanical agency had for him two major theoretical consequences. First, it made cinema a privileged vector for the "fortuitous," an unpredictable spontaneity that is captured by the camera but eludes human control. Second, it made looking at films and photographs an alienating and defamiliarizing experience for human viewers. Natural history films are an especially good case study for Kracauer's theory of film because their animal subjects act as nonhuman agents that resist human intentionality; they are, to borrow one of his phrases, "the shock troops of unconquered nature."⁷¹ Or to put it another way, the camera and the animals are complementary emblems of the nonhuman otherness that attracted so many modernist writers to film in the first place.

A caveat is in order here. Although Kracauer's claim about film's capacity to highlight the chance, spontaneous events in the world seems ontological rather than historical—that is, it is a claim about the essence of film—it is an unfashionable one in contemporary film theory. We have learned, from Roland Barthes and his followers, the many ways in which photographic and cinematographic images signify, and a reading of these images not as signifiers but as pure records of reality now seems naïve.⁷² The progress of commercial film as the twentieth century moves forward also seems to render Kracauer's claims increasingly irrelevant. Directors and cinematographers have developed increasingly better control over their sets, their cameras, and their actors; with technologies like CGI, perhaps the "fortuitous" aspect of film is eradicated. Even in the 1920s and 30s, when the *Secrets of Nature* were filmed, we see signs that humans are

⁷¹ Kracauer, *Marseille Notebooks* 1, 39-40; quoted in Miriam Hansen, "With Skin and Hair': Kracauer's Theory of Film, Marseille 1940," 460.

⁷² See *Mythologies* and *Image, Music, Text* (particularly the first three essays) for representative examples of Barthes' semiotic readings of photographic and filmic images.

gaining ever more mastery over cinema, and the *Secrets* themselves go to great lengths, through their editing and production practices, to present us with a technically polished final product in which “the shock troops of unconquered nature” are subdued.

I want to argue, though, that the modernist theory of film as an inhuman record and a sanctuary for spontaneity is useful for understanding the real element of unpredictability that characterizes early cinema, when filmmakers were not always in total control of their medium or their subjects, and films were not always polished works of art. Early cinema, which by necessity or by design embraced contingency, left its traces on the *Secrets of Nature*, and these traces locate the films in their particular, modernist moment. Other recent critics, including Mary Ann Doane and René Thoreau Bruckner, James Leo Cahill, and Greg Siegel, have argued that contingency continues to be an important concept for film theory. Bruckner, Cahill, and Siegel write, in their introduction to a special issue of *Discourse* on cinema and the accidental, that while film criticism and theory have tended to read films as orderly systems of meaning-making, they have not “succeeded in abolishing the accidental.”⁷³ Mary Ann Doane’s *Emergence of Cinematic Time* argues that contingency is the flip side of cinema’s rationalization of time, and that filmic contingency simultaneously resists the systematicity of modern capitalism and works to “make tolerable” that systematicity.⁷⁴ I agree with these critics that film’s ability to record the accidental is not just a naïve belief of early filmgoers, but rather a trait of the medium which has played an important role in film history. I want to emphasize, however, that in natural history films what looks like contingency is not always pure chance; sometimes it is a sign of nonhuman forms of agency emerging to surprise the filmmaker and the viewer.

⁷³ Bruckner, Cahill, and Siegel, “Introduction: Cinema and Accident,” 280.

⁷⁴ Doane, *The Emergence of Cinematic Time*, 11.

Early cinema was particularly well-suited to showcasing the indexicality of film and its attendant ability to capture chance events. Cinema has come to be primarily a storytelling medium, but Tom Gunning has shown that in films made between 1895 and 1907 or thereabouts, representation and narrative were upstaged by instantaneous visual presentation. The cinema of attractions emphasized spectacle over story, showing over telling. “[T]he cinema of attractions solicits a highly conscious awareness of the film image engaging the viewer’s curiosity,” Gunning claims.⁷⁵ Miriam Hansen writes that attractions films invoke a “*presentational*—as opposed to *representational*—conception of space and address.”⁷⁶ This is immediacy *as* hypermediacy—the film presents itself to the spectator *as* a film. The attractions aesthetic places narrative absorption and imagistic signification on the back burner in order to foreground the medium of film itself—film as automatic and inhuman.

Although the cinema of attractions grew out of Victorian spectacles such as the magic lantern show, it is often associated with modernist values and aesthetics, in contrast with the Hollywood narratives that would later come to dominate the industry, which seem to critics more closely aligned with nineteenth-century novels.⁷⁷ By 1922, the cinema of attractions was largely a thing of the past, replaced by classical narrative cinema. But I believe that the attractions aesthetic plays an important role in the *Secrets of Nature*, despite their later dates of production.

⁷⁵ Gunning, “An Aesthetic of Astonishment: Early Film and the (In)Credulous Spectator,” 121.

⁷⁶ Hansen, *Babel and Babylon*, 34.

⁷⁷ Gunning himself claims, in “The Cinema of Attractions: Early Film, Its Spectator and the Avant-Garde,” that the cinema of attractions was an important inspiration for twentieth-century avant-gardes including Futurists, Dadaists, and Surrealists (56). As I have discussed, David Trotter’s *Cinema and Modernism* also addresses the link between modernist writing and attractions films. Standish D. Lawder’s *The Cubist Cinema* identifies connections between modernist art and film. Perhaps the most important figure to link classical Hollywood narrative with the nineteenth-century novel was Sergei Eisenstein, in his essay “Dickens, Griffith, and the Film Today.” See also Rick Altman’s “Dickens, Griffith, and Film Theory Today” and Keith Cohen’s *Film and Fiction: The Dynamics of Exchange* for a discussion of classical Hollywood film’s relationship to the novel.

While the *Secrets*' intertitles and narrations attempt to tell a story or at least provide exposition, the spectacle of the images often seems to drown out this discourse. It is as if the image track is saying, "Here are myxies!" or "Here is a cuckoo!" Such an aesthetic privileges visual presence over symbolic, narrative, or even educational meaning. And as we have seen, while the narrative aspects of the *Secrets* usually domesticate and anthropomorphize the creatures on display, the films' visual aspects typically defamiliarize those creatures.

Kracauer's "Photography" shares with the cinema of attractions discourse a sense that the photographic/cinematographic image can present itself outside human codes of narrative and signification. Kracauer compares an old photograph of his grandmother as a young girl to a contemporary photograph of a film diva, meditating on photography's uncanny effects:

For the first time in history, photography brings to the fore the entire natural shell; for the first time the inert world presents itself in its independence from human beings. Photography shows cities in aerial shots, brings crockets and figures down from the Gothic cathedrals; all spatial configurations are incorporated into the central archive in unusual combinations that distance them from human proximity. Once the grandmother's costume has lost its relationship to the present it will no longer be funny, but peculiar like a submarine octopus... The photographic archive assembles in effigy the last elements of a nature alienated from meaning.⁷⁸

The camera can occupy aerial and elevated points of view that people can rarely access, and it shows a world independent of human meaning and patterned without reference to human order. This is true for Kracauer even when the photograph's object is a human product, like a cathedral or a city; these inanimate things become alienated in the photograph, stripped of their instrumental purposes. Janet Harbord claims that "[a]lienation, for Kracauer, is... a form of estrangement from things and a potentially new way of engaging."⁷⁹ In this passage, Kracauer's reading of the photograph as a presentation of estranged nature is a way of engaging with, not

⁷⁸ Siegfried Kracauer, "Photography," 435.

⁷⁹ Harbord, "Contingency's Work: Kracauer's Theory of Film and the Trope of the Accidental," 93.

disengaging from, the nonhuman world, because photography allows us to finally encounter that world on its own terms.

Kracauer is not alone in this belief that photographic images show us the nonhuman world in a way that we cannot normally perceive it. Walter Benjamin and Julian Huxley are also fascinated by the difference between the camera eye and the human eye. Huxley writes, “The film, by means of its independence of time, is capable of giving a direct realization of processes that are too fast or too slow for the eye. A humming-bird’s flight, which we perceive as a mere blur, can be analyzing by slowing-down; and by speeding-up, a long and complex sequence of events can be grasped as a single process.”⁸⁰ This capacity is what Benjamin describes as the optical unconscious, the “structures of matter” and “aspects of movement” that are visible in film but invisible to the naked eye, and that led him to declare, “Clearly, it is another nature which speaks to the camera as compared to the eye.”⁸¹ Kracauer, Benjamin, and Huxley invest the camera with a kind of mechanical agency that is not reducible to human intentions—the camera “sees” and makes visible things we could never have anticipated. In the works of literary modernists—Woolf, Joyce, Eliot—David Trotter identifies a similar “will to automatism” that finds its clearest expression in film. These writers, he contends, want to be a camera, or to see and write about the world as if they were a mechanical recording device rather than a human subject. Automatism is not, of course, the only way to not be human. The desire to access the world outside of human subjectivity through film is similar to the desire, which I discuss in Chapter Four, that led some modernists to imagine being an animal.

⁸⁰ Huxley, “Films and Science: Biology,” 151.

⁸¹ Benjamin, “The Work of Art in the Age of Its Technological Reproducibility,” 266.

For Kracauer contingency is the marker, in photographs and films, of nature's ability to exceed human intention. He expands cinema's technical ability to record unexpected events into the thematic category of the fortuitous:

The affinity of film for haphazard contingencies is most strikingly demonstrated by its unwavering susceptibility to the "street".... [T]he street, which has already been characterized as a center of fleeting impressions, is of interest as a region where the accidental prevails over the providential, and happenings in the nature of unexpected incidents are all but the rule.⁸²

Kracauer thinks that slapstick comedies are especially adept at turning "the affinity of film for haphazard contingencies" into a principle of narrative content. He praises these films for minimizing their protagonists' prowess and emphasizing the role of "sheer chance" in their narrow escapes.⁸³ As Miriam Hansen describes, Kracauer saw slapstick as "a genre that systematically confronts intentionality with 'material life at its crudest' ('the shock troops of unconquered nature.')⁸⁴

Secrets of Nature is not slapstick, but like slapstick it showcases chance and "unconquered nature" at the expense of human intention and control. I want to argue, however, that natural history films like the *Secrets* show us that nature's contingency is not the only affront to human intention visible in film. The camera also indexes animals' agency, their undirected movements and behaviors. These behaviors may have looked like mere accidents to Kracauer, no different from the fluttering of leaves or the chance encounters of the street. But the *Secrets* filmmakers knew better. Writing of the difficulties in filming zoo animals, Mary Field and Percy Smith recall, "The animal that we have been hoping to photograph gives a look at the crowd and then slinks away in disgust to some dark and inaccessible corner where it can ponder on the

⁸² Kracauer, *Theory of Film*, 62.

⁸³ *Ibid.*, 62.

⁸⁴ Hansen, "'With Skin and Hair,'" 460.

repellent qualities of human beings in general.”⁸⁵ This is a moment of anthropomorphic joking, but underneath the joking is the more serious realization that the zoo animals are subjects with minds of their own. Their “slinking away” is not random bad luck; it is an expression of their fear or dislike of large crowds of people. Filming animals is not only a struggle against chance, but also an encounter with animal subjects who may or may not cooperate.

One of the *Secrets, Fathoms Deep Beneath the Sea*, offers a sense of how film indexes a world that resists human control through both accidents and animal agency. *Fathoms Deep* presents an inventory of sea creatures: an octopus, sea anemones, crabs, various fish, sea stars, and so on. The film only occasionally provides any narrative or expository development across multiple shots; for the most part, its additive presentation of different sea animals resembles a string of actuality films or an illustrated lecture, rather than a typical 1920s film. Intertitles give some verbal explanation of the different shots, but rarely seem to accurately capture what is going on in the images. Stylistically, *Fathoms Deep* has a lot in common with the 1912 Scientia film *Le Scorpion Languedocien*, which Oliver Gaycken has analyzed in “‘A Drama Unites Them in a Fight to the Death’: Some Remarks on the Flourishing of a Cinema of Scientific Vernacularization in France, 1909-1914.” Both films resemble illustrated lectures; both include intertitles that do not match the images they are supposed to narrate; both films even feature animals pressing up against the glass walls of their tank, breaking the fourth wall in the act of revealing it. Gaycken concludes that science films like *Le Scorpion Languedocien* are overtly marked by human intervention: “a hand consistently invades the image, poking, prodding, manipulating, breaking, dissecting, and marking the distance between this mode of scientific

⁸⁵ Mary Field and Percy Smith, *Secrets of Nature*, 52.

cinema and other practices.”⁸⁶ It is undoubtedly true that human manipulation plays a major role in natural history films, including *Fathoms Deep*. But what interests me most about this film, and what I think attracted modernist film commentators to natural history films, are the moments when human manipulation fails—when the images give the lie to the intertitles, when contingency strikes, and when the animals fail to do what they are supposed to.

The octopus in *Fathoms Deep* would probably have amused Kracauer, who used the phrase “peculiar like a submarine octopus” as a simile for the strangeness of the old photograph. This octopus seems especially peculiar because its behavior does not match the sensationalism of the intertitle that precedes it.⁸⁷ The intertitle reads, “The Octopus shoots out his tentacles armed with their fearsome suckers from which there is no escape.” But the octopus does not capture anything with his suckers. Instead, isolated in an aquarium, he swims, curling and stretching his tentacles and pressing his suckers against the glass. Perhaps audiences are meant to imagine themselves as the prey, but if so, the intention fails when the distortion of the octopus’s suckers points to the presence of a glass wall between him and us. This is also a moment that foregrounds the medium of film. The mediation of the glass replicates the mediation of the camera lens, reminding us that we are watching a film, but also that it is film that makes this encounter possible.

A further example of this mismatch between intertitle and image occurs with the sea anemones, another reputedly fierce species. The intertitle reads, “The Sea Anemones look harmless enough, but concealed about their bodies are terrible stinging cells, which paralyze

⁸⁶ Gaycken, “‘A Drama Unites Them in a Fight to the Death’: Some Remarks on the Flourishing of a Cinema of Scientific Vernacularization in France, 1909-1914,” 370.

⁸⁷ Palle B. Petterson has made a similar observation about the *Secrets* film *Battle of the Ants*, writing that “Often the pictures cannot live up to the dramatic action described in the intertitle” (*Cameras into the Wild* 153).

small fishes which happen to brush against them.” Following this intertitle is a shot of a group of sea anemones on the “ocean floor” (recreated in an aquarium). After several seconds, a fish enters the frame and approaches the anemone, which retracts slightly. But the fish does *not* brush against the anemones, does *not* get stung by the stinging cells, and is *not* paralyzed. The intertitles produce a vision of a violent struggle for survival within the ocean, a struggle that is not evident in the images. That narrative of violence and brutality in nature is not a comforting one, by any means; but it is a familiar and legible one. When the images fail to live up to the sensationalistic intertitles, they—and the creatures presented in them—seem more inscrutable than ever. Their failures also become a kind of excess; the octopus and fish move of their own accord, their limited agency overruling the filmmakers’ taste for exciting and legible narrative.

The cinematography of *Fathoms Deep* also bears traces of the animal subjects’ agentic behavior. The shot of the octopus, for example, is about forty seconds long (with a couple of jump cuts in it) and recorded with a stationary camera. But the octopus spends about twenty-five of those seconds trying to swim off the screen, parts of its body concealed outside the frame. The composition of the shot is thus unbalanced and off-center, reflecting the difficulties of directing an animal and circumscribing its movement for the purpose of filming (Fig. 10). A similar framing problem happens with the conger (a kind of fish). An intertitle preceding the shot of the conger reads, “From the shelter of a rock the ravenous Conger darts upon his victims.” The shot present an eel-like fish facing the left side of the frame, sheltered by rocks on the right. The conger darts to the left once and his head exits the frame, concealing whether he has actually seen or swallowed any prey. The attack to which the intertitle refers either does not happen at all or happens offscreen. If the latter, then the conger’s excessive darting works against the

filmmakers' attempts to capture him eating; if the former, then his movement out of the frame still foils viewers' expectations. The conger, like the octopus, proves impossible to fully manage.



Figure 10

Even when the cinematographer employs a moving camera, the sea creatures still elude expectations and behave unpredictably. The shot of the sea anemones and the fish that they almost sting begins with a slow pan left; after about thirteen seconds (an uncomfortably long time), the fish finally enters the frame. The camera then pans left much faster, apparently overshoots its mark, and immediately pans right again in an effort to center the moving fish and the sea anemone in the frame. The unevenly-paced camera movement gives the shot an amateurish feel, and we might attribute the awkward attempts at centering the subjects within the frame to the filmmakers' ineptitude or to the crude quality of early cinema in general. But the

unpolished cinematography also reminds viewers that they are watching live animals whose movements cannot be orchestrated—a director cannot tell a fish, “Swim to your left!”—and that to a certain extent the camera must follow the animals rather than vice versa. When this is the case, the camera must always be a fraction of a second behind the action.

It would be a mistake to exaggerate the agency of the octopus or the fish. After all, they are kept in captivity; there are only so many places in the aquarium that they can go. But though they are contained by the tank, they are not always contained by the filmic frame. This is, to borrow Miriam Hansen’s words, “an institutionally bounded form of play” that is also literally bounded but that offers viewers encounters with nature’s contingency and, even more, with animals’ agency.⁸⁸ It is difficult, however, to tease out the animals’ agentic behaviors from sheer contingency and from the invisible manipulation by the human hand that Gaycken describes. Donna Haraway discusses this problem in relation to *Crittercam*, a television show in which scientists attach cameras to wild animals in order to record what happens in “nature” when humans are not there. Haraway reads this nexus of camera, animal, and human as a “colonial organism” made up of “many kinds of coordinated, agential zoons.”⁸⁹ She argues that agency is something that happens in relations, rather than something that animals, people, or technologies “have.”⁹⁰ I have found it useful to locate moments in *Fathoms Deep* when animal agency becomes visible in relief against the filmmakers’ intentions, because these moments offer an important challenge to the dominant critical understanding of the natural history film as an entirely controlled and conventionalized human product. But ultimately I think Haraway is right

⁸⁸ Hansen, ““With Skin and Hair,”” 465.

⁸⁹ Haraway, *When Species Meet*, 261,

⁹⁰ *Ibid.*, 262.

that human, animal, and mechanical agency are interlocked in nature filmmaking in ways that cannot usually be disentangled.

Modernist film commentators were attracted to nature films because of their inhuman aesthetic, and modernist film theory is useful for illuminating the ways that film can offer us encounters with “another nature”—a world not already dominated by human meanings and intentions. The camera, a nonhuman actor, records whatever chance events occur before it: “the porous film stock absorbs the random fleeting events before it, in spite of any intentional agency on the part of the camera operator.”⁹¹ The *Secrets of Nature* help us amend this modernist film theory by showing that random chance is not the only challenger to human intention in film, but is accompanied by the agency of animals. Modernist film theory is a bit too utopian in its insistence that the photograph or film can truly be independent from the human world, but it is nevertheless valuable for pointing out that human manipulation of natural materials is not the only story to be told about filmmaking. The natural history film is certainly a human creation, but it is also a product of inhuman recording technologies and animal subjects, a collaborative creation by different kinds of agents, not all of them human.

Conclusion: Modernism and the Nonhuman

The *Secrets of Nature* films fit diachronically into the natural history tradition of the nineteenth and early twentieth centuries, and synchronically into the modernist visual culture and film theory of the 1920s and 30s. The films thus tend to have multiple, often contradictory aesthetic effects—what seems at one moment to be a domestic, anthropomorphic narrative about animals gives way the next moment to strange, defamiliarizing images. These aesthetic effects

⁹¹ Harbord, 91.

point to a larger conflict of values in the films—while the narrations and editing assert an anthropocentric and morally conservative view of nature, the images tend instead to decenter the human and display a startlingly nonhuman world. Neither an updated version of natural theology nor a self-consciously posthumanist vision, the *Secrets of Nature* instead reflect tensions and doubts in modernist British culture about what meaning could be found in nature and what value in the nonhuman.

The *Secrets* are indebted to Victorian natural history for their domestic narratives and anthropomorphic tropes, but the debt does not stop there. Even the most apparently modernist and abstract images in the films can be traced back to earlier natural history spectacles in the Edwardian and Victorian eras, from the surprising microscopic forms to the high-contrast black-and-white images. The *Secrets*' imagery points to a gradual evolution in the visual culture of natural history, from the lectures, magic lanterns, and microscope manuals of the 1870s and 80s to the cinematography of the 1920s. If there is a rupture in this history, it occurs not between the Victorian and the modernist, but between the early- and mid-Victorian conventions of natural history illustration and the late-Victorian emphasis on spectacle and surprise in natural history. The account of natural history's visual culture which grounds my analysis of the *Secrets of Nature*, then, differs from other traditional histories of aesthetics by finding continuity and gradual change, not discontinuity, between Victorian and modernist works.

Yet the films have unmistakable resonances with the modernist art that *did* break radically from the realist conventions of earlier art—they share with this art an aesthetics of defamiliarization, uncanniness, and hypermediacy. These resonances and resemblances give us cause to reevaluate aesthetic modernism in light of its connection to the visual culture of natural history. Natural history is typically seen as an important and characteristic part of Victorian

culture, not modernist culture; but the *Secrets of Nature* are evidence that natural history changed with the times, retaining both its cultural importance and its dialogue with contemporary art and literature. The films, in conjunction with the film theory of Benjamin and Kracauer and the paintings of artists like Georgia O’Keeffe, are also evidence that aesthetic modernism was not nearly as hostile to “nature” as we usually assume. Mimetic media like photography and film could produce images of other species that graphically resembled abstract art, showcasing the strange and often lovely forms of plants, animals, and microorganisms. Breaking away from the old conventions of naturalistic representation, modernist natural history established a new intimacy between human-produced optical technologies and nonhuman species.

The *Secrets of Nature* help us understand why many commentators in the early twentieth century believed that cinema was an ideal meeting ground between art and science. Walter Benjamin claimed that film’s unveiling of the optical unconscious “foster[s] the interpenetration of art and science”; film demonstrates that “the artistic uses of photography are identical to its scientific uses.”⁹² And the British film critic H.D. Waley wrote that film provides many “instances in which the overlapping between Art and Science has taken place at the same point, so that there is really a close resemblance between what one might call the art-diagram and the science-picture.” Waley continues,

Much of this resemblance may, of course, be discounted as being a mere coincidence, but there is also undoubtedly an inevitable relationship between the artist and the scientist in this sphere of illustrating animal life. The natural grace of many animal movements tends to awaken the artistic sensibilities of the scientist, while the artist has perforce to become an accurate observer of facts in order to possess himself of the raw material for his imaginative work.⁹³

⁹² Benjamin, “The Work of Art in the Age of Its Technological Reproducibility,” 265.

⁹³ Waley, “Art and Science,” 32.

Natural history films, at the border of art and science, record images that are of both scientific and aesthetic interest. I have suggested throughout this dissertation that an interest in animals led writers to observe as zoologists and zoologists to write as novelists or poets. This boundary-crossing is seldom clearer than in Benjamin and Waley's comments and in the *Secrets* films, and it provides a new way of understanding the common image of modernism *as* science. To Eliot's vision of poetry as chemistry, a catalytic reaction between tradition and creativity, and Pound's vision of the arts as "a science, just as chemistry is a science," we may add viewers' perceptions of zoological films as at once artistic and scientific documents, aesthetically beautiful and scientifically meaningful.⁹⁴

The genre of early natural history films, and the film theory that illuminates them, also point to a larger philosophical trend in early twentieth-century culture: a decentering of the human and revaluation of the nonhuman or inhuman in its many forms. The technological inhumanness of machines like the camera seems quite different from the nonhumanness of animals, plants, and other species—one is mechanical and modern, the other vital and primitive, or at least perceived as such. Cameras are automatic, animals are living subjects. Without collapsing the differences between these two types of nonhuman agents, however, we can say that their intimate conjunction in natural history film and film theory helps to uncover modernism's attraction to the nonhuman in its many manifestations. The *Secrets of Nature* make good on the promise so many modernists saw in cinematic technologies—the promise to let viewers see with the camera eye instead of the human eye, to show them new perspectives on their familiar world. The next chapter discusses the literary techniques that let readers see from an animal's perspective. I would contend that these two desires—to see the world through the

⁹⁴ Eliot, "Tradition and the Individual Talent," 2546; Pound, "The Serious Artist," 161.

lenses of the microscope, camera, and other optical technologies, and to see the world through the sensorium of an animal—stem from a common impulse that was widespread in the modernist moment. It is the impulse to shed the human perspective, to step outside of human subjectivity, and to see anew the richness and multiplicity of the nonhuman world.

CHAPTER IV

INHABITING THE ANIMAL MIND: RUSSELL, HALDANE, WOOLF

That many modernists were interested in perspectivism—in the multiplicity, contingency, and variety of standpoints from which one might view the world—is not a new observation. Modernist critics over the years have told a story about how the absolute, objective point of view in which many Victorians believed fractured into many subjective, partial perspectives around the turn of the twentieth century, a narrative that spans multiple disciplines to embrace the relativity theory of Einstein, the shifting voice of Eliot’s “The Waste Land,” and the Cubism of Picasso and Braque. What has not been observed is that many modernist thinkers were interested not just in human perspectives, but also in those of animals. Kafka wrote many tales narrated by animals; the Expressionist painter Franz Marc wrote an essay asking, “How does a horse see the world?”; and the Russian Formalist critic Viktor Shklovsky pointed to a story about an animal’s perspective as the example *par excellence* of defamiliarization.¹ In this chapter, I explore shared patterns of representing animal minds across the literary and scientific writing of the Bloomsbury circle. Bloomsburyites of various stripes, from the writer Virginia Woolf to the biologist J.B.S. Haldane to the philosopher Bertrand Russell, constructed a version of animal consciousness that challenged and provided an alternative to more familiar versions of human consciousness. Animal perspectives offered them an opportunity to raise important questions about epistemology and subjectivity. By imagining animals’ perceptions and experiences, these writers

¹ Kafka’s animal tales include “A Report to an Academy,” “Investigations of a Dog,” “Josephine the Singer, or the Mouse Folk,” “The Burrow,” and of course, *The Metamorphosis*. See also Franz Marc’s “How Does a Horse See the World?” and Shklovsky’s “Art as Technique.”

uncovered peculiarly inhuman shades of consciousness and strange and novel views of the world.

“Animals, including human beings, view the world from a center consisting of the here and now. Our senses, like a candle in the night, spread a gradually diminishing illumination upon objects as they become more distant,” wrote Bertrand Russell in *Portraits from Memory and Other Essays*.² Russell’s words capture several beliefs about animals that he shared with contemporary scientists and writers. First, humans are not qualitatively different from other species—the parenthetical aside “including human beings” subordinates the category of “human beings” to the more inclusive and important category of “animals.” Second, all animals have perspectives, unique and ever-changing standpoints from which they perceive the world around them. And third, the senses are the medium of experience and knowledge for all species. The analogy of candlelight illuminating the world around the subject cannot but recall the trope of knowledge as enlightenment; thus, Russell indicates that humans and other species experience and learn through vision and other sensory perceptions, a belief that places him within the empiricist tradition.

I contend that other Bloomsbury thinkers, such as Woolf and Haldane, shared these views about animal senses and animal minds, and that they revised the concept of human subjectivity by remodeling it after the animal. Their works are steeped in empiricist philosophy, and the primacy of sensation as the ground of experience and knowledge is never far from their minds. At the same time, these writers felt uncomfortable with the concept of the liberal humanist subject, that well-formed, rational, and autonomous being invented by Enlightenment philosophers, because it privileged mind over body, it overstated the individual’s freedom and

² Russell, *Portraits from Memory and Other Essays*, 178.

self-determination, and it did not speak to their experiences in a bewildering and violent twentieth-century world.³ The animal mind offered these modernist writers an opportunity to consider the more radical consequences of empiricism and to think their way out of the traditional models of subjectivity that had been handed down to them.

Russell, Haldane, and Woolf explored animal perspectives, first, to recast knowledge as a collection of partial, subjective observations, and second, to distill the human subject into something less coherent and stable, something more animal-like and permeable to the outside world. These figures' outlook on knowledge is perhaps best expressed by Haldane, who wrote, "Our only hope of understanding the universe is to look at it from as many different points of view as possible."⁴ Developments in nineteenth-century physiology showed that the senses, far from being transparent vehicles of information, were instead fallible and limited biological systems; developments in nineteenth-century psychology, meanwhile, revealed the probability of unconscious beliefs and biases. Science could no longer be absolute or objective once scientists were understood as humans with human senses and human psyches. Thus, modernists like Haldane came to believe that multiplying perspectives was the best path to knowledge; no single perspective would do.

These figures' outlook on subjectivity, meanwhile, is perhaps best expressed in the term "bare subjectivity," a notion that they approach via the animal mind. I borrow and adapt this term from Russell to describe the distilled, reduced subject at which modernists arrive through

³ My understanding of the liberal humanist subject, as a supposedly universal, rational, autonomous, and self-determining model of humanity, draws on N. Katherine Hayles' *How We Became Posthuman*, Sherryl Vint's *Bodies of Tomorrow*, and Cary Wolfe's *What is Posthumanism?*. These books also give a good sense of the critiques of the liberal humanist subject that are made in many corners of the literary critical universe—feminist, postcolonial, Marxist, and posthumanist, to name a few.

⁴ Haldane, *Possible Worlds*, 285-6; subsequent references cited in text as *PW*.

studying animal perspectives. For Russell, the bare subject is the subject we infer when describing a momentary experience. To build an understanding of experience, we must “pare away from the ‘I’ a great deal that is usually included... [such as] the past and future in so far as they may possibly not belong to the subject of the present experience.”⁵ What is left after this paring-away is the bare subject, a subject unknown except as a fiction drawn from a sensory experience under the presumption that “when we are aware of experiencing an object *O*,” there must be “something [that] is acquainted with *O*” (*TK* 37). I use the concept of bare subjectivity in a more elastic sense than Russell. For my purposes, the bare subject is the subject of sensational and perceptual experience, a subject stripped of its intellectual and ideological baggage and free of culture. It is the kernel of subjectivity that seems, at least in modernist writing, to have a different, more direct contact with the body and the external world. Animals are the most proximate examples of this kind of subjectivity, but writers such as Woolf suggest that sometimes humans can access it too.

We can understand modernists’ curiosity about animal minds, their attempts to inhabit animal perspectives and see the world from a different point of view, as a form of empathic epistemology. Theodor Lipps contended that empathy allows people to know others and to understand others’ mental states; in this respect, empathy can be seen as an alternative to solipsism.⁶ It helps answer a question that loomed large for Russell, Woolf, and others: how can we know things beyond our own direct experience?⁷ Through imaginatively projecting ourselves

⁵ Russell, *Theory of Knowledge*, 36; subsequent references cited in text as *TK*.

⁶ Montag et al., “Theodor Lipps and the Concept of Empathy: 1851-1914,” 1261.

⁷ Modernism’s abiding concern with skepticism, its doubt that absolute knowledge or universal truths could ever be reached, has been discussed by Mark Wollaeger, who writes that while modern science and pragmatic philosophy found a way to live with “epistemological limitations” and “[make] do with what can be established short of absolute certainty,” modernist writers like Conrad were never quite satisfied with this kind of compromised knowledge (13). See *Joseph*

into others—human or animal—we can potentially stretch beyond our own private world and collect knowledge, or something like it, beyond the data provided by our own senses. The modernists I discuss in this chapter all reject solipsism; though they believe that sense-data are the foundation of knowledge, they also believe that we must accept the sense-data of others as real in order to build any sustainable system of knowledge. As Russell argued, solipsism might be philosophically unimpeachable, but it is practically untenable.⁸ When the modernists discussed in this chapter empathize with animals, then, they do so not necessarily to advocate for kinder or fairer treatment of animals, but to expand their knowledge of the external world and re-imagine their relationship with that world.

Even though all the writers I discuss in this chapter prefer empathic quasi-knowledge to solipsistic obscurity, they acknowledge the limitations and possible pitfalls of this form of knowing. As fascinated as they are by the image of animal subjectivity that they have constructed, they are equally fascinated by the unknowable core of the animal mind, the experience that continually eludes our grasp. This is perhaps what Leonard Woolf had in mind when he wrote, “There is... a cosmic strangeness about animals which always fascinates me and gives to my affection for them a mysterious depth and background.”⁹ Animal perspectives offer modernists new forms of knowledge, but they also retain a certain amount of mystery, or cosmic strangeness, that reminds us there are some things we cannot know. Thus, even though I read the modernist interest in animal perspectives as a generally empathic impulse, the desire to inhabit other points of view is counterbalanced by a sense of distance between species. What one animal

Conrad and the Fictions of Skepticism, 7-15, for an account of the tradition of skepticism and its impact on Conrad and his contemporaries.

⁸ Russell said, regarding solipsism, “I do not think this theory can be refuted, but I also do not think that anybody can sincerely believe it” (*My Philosophical Development* 78).

⁹ Leonard Woolf, *Growing*, 100.

psychologist calls “the unbridgeable gap between minds” has its attractions for modernists just as empathic identification does.

This chapter will explore early twentieth-century accounts of animal subjectivity in four parts. First, I will offer a historical overview of the field of animal psychology as it developed in the late nineteenth and early twentieth centuries, noting in particular a debate over whether or not biologists and psychologists can study animals’ subjective experiences in a scientific way. Animal psychology directly influenced the next two figures I discuss, Russell and Haldane. Russell studied animal psychology in the late 1910s in order to develop his theory of mind, while Haldane played with the possibilities that the field afforded in his essay “Possible Worlds.” Russell offers a philosophical foundation for modernist perspectivism; Haldane, meanwhile, explores perspectivism’s implications for scientific knowledge.

Finally, I turn to Woolf to analyze her depictions of animal consciousness in “The Mark on the Wall,” “Kew Gardens,” and *Flush*. Woolf was probably not directly acquainted with the scientific literature on animal psychology, but she *was* acquainted with Haldane and Russell, and thus with the ideas about knowledge and subjectivity that became attached to animal minds in modernist scientific thought. Russell and Haldane were peripheral members of the Bloomsbury circle that centered around Woolf and her sister, Vanessa Bell. All three were visitors, Woolf and Russell frequent and Haldane occasional, to Garsington Manor, the home of Lady Ottoline Morrell and a popular destination for the London intelligentsia. Woolf, Russell, and Haldane would also have met at the Cambridge Heretics Society, a group founded in 1909 for intellectual debate and the promotion of unorthodox views.¹⁰ Woolf’s fiction borrows the tropes of animal

¹⁰ See Ann Banfield’s *The Phantom Table* for an account of Woolf and Russell’s acquaintance. Woolf’s acquaintance with Haldane is more difficult to document. Holly Henry claims, in *Virginia Woolf and the Discourse of Science*, that Woolf read and knew Haldane (3, 68). The

consciousness from Haldane, Russell, and the animal psychologists, and deploys these tropes to reimagine the human subject. These three figures make an apt cross-section of British modernist culture, and their work engages seriously with the issue of animal consciousness. Their representations of animal minds demand revised epistemologies and introduce alternative ways of being a subject in the world.

Animal Psychology and the Problem of Animal Experience

Animal psychology was, in the period between 1890 and 1930, a modernist discipline, aligned with modernist literary concerns such as the belief in a plurality of perspectives, the exploration of consciousness, and the need to denaturalize our own point of view and see the world through different eyes. Early animal psychologists had fairly consistent ideas about what animal consciousness felt like: it was embodied rather than cerebral, passive rather than active, ruled by sensation rather than cognition.¹¹ The American comparative psychologist Edward Thorndike affords a representative example of how the typical biologist or psychologist understood animal experience. A rather skeptical psychologist, Thorndike eschewed all but the most rigidly experimental methods for studying animal minds. While many biologists went out into the field to study animal behavior armed with only binoculars and a notebook, Thorndike

only direct evidence of a meeting between Woolf and Haldane that I have been able to uncover is in the appendix to *The Essays of Virginia Woolf, Volume III*, which states that when Woolf went to Cambridge in 1924 to deliver her “Character in Fiction” lecture to the Heretics Society, she had dinner with several people “including the eminent Heretic J.B.S. Haldane” (501).

¹¹ The idea that understanding animal minds means understanding what it is like to be an animal is a historically specific one, as Lorraine Daston argues in “Intelligences: Angelic, Animal, Human.” She claims that only with the rise of the concepts of objectivity and subjectivity in the nineteenth century did knowledge about nonhuman minds come to mean the ability to put oneself in another’s place; in the Middle Ages, for instance, theologians’ study of angels’ minds revolved around their structures of thinking, not the question of what it is like to be an angel (52-54; 40).

performed his experiments in a psychology laboratory at Columbia University.¹² Yet when it came to describing what it felt like to be a nonhuman animal, Thorndike could not help waxing poetic. In his 1911 book *Animal Intelligence* he wrote that by watching animals, one

gets, or fancies he gets, a fairly definite idea of what the intellectual life of a cat or dog feels like. It is most like what we feel when consciousness contains little thought about anything, when we feel the sense-impulses in their first intention, so to speak, when we feel our own body, and the impulses we give to it. Sometimes we get this animal consciousness in swimming, for example. One feels the water, the sky, the birds above, but with no thoughts *about* them or memories of how they looked at other times, or aesthetic judgments about their beauty; one feels no *ideas* about what movements he will make, but feels himself to make them, feels his body throughout. Self-consciousness dies away. The meanings, and values, and connections of things die away. One feels sense-impressions, has impulses, feels the movements he makes; that is all.¹³

Thorndike offers a lyrical evocation of animal consciousness that enhances its appeal to weary human minds. In penning this passage, he is playing on his audience's recognition of the desire to shed all one's intellectual ideas in favor of a more direct and embodied relationship to the external world. The repetition of the word "feel"—ten times in this passage—establishes Thorndike's main claim about animal consciousness: it is dominated by feeling, by reception of sensory stimuli both within and outside the body, with only a minimal amount of cognitive processing. It is, for him, a purer state of being.

Many other scientists and writers shared Thorndike's understanding of animal consciousness as non-intellectual and primarily perceptual, but we must remember that this picture is culturally and ideologically determined. We can detect in Thorndike's prose a primitivist impulse, not unlike that expressed by a D.H. Lawrence character: "You want to go back and be like a savage, without knowledge. You want a life of pure sensation..."¹⁴ Being like an animal, with pure sensation, without knowledge, sounds appealing in Thorndike's account;

¹² Boakes, *From Darwin to Behaviourism*, 72-3.

¹³ Thorndike, *Animal Intelligence*, 123.

¹⁴ Lawrence, *Women in Love*, 46.

but the account and appeal likely have as much to do with the cultural attraction to primitivism as they do with actual animal life. As Russell jokes,

It seem[s] that animals always behave in a manner showing the rightness of the philosophy entertained by the man who observes them.... In the seventeenth century, animals were ferocious, but under the influence of Rousseau they began to exemplify the cult of the Noble Savage... Throughout the reign of Queen Victoria all apes were virtuous monogamists, but during the dissolute 'twenties their morals underwent a disastrous deterioration.¹⁵

Russell playfully reminds us that, though the image of animal experience as passive, peaceful, and pure was culturally pervasive, and though it had some basis in scientific evidence, it was also heavily influenced by the expectations and desires of the observers and of modernist culture in general. Animal experience looked like an alluring respite from human anxieties because people *wanted* to see it that way.

Though animal psychologists had distinct ideas about what animals' subjective experiences were like, they found it difficult to substantiate these ideas. Margaret Washburn demonstrates this epistemological unease in the third edition of her book *The Animal Mind: A Text-Book of Comparative Psychology* (1926). She believes that understanding animal experience is the goal of animal psychology as a discipline, and claims, "We have wonderfully advanced, within the last twenty-five years, in knowledge as to how the world looks from the point of view of our brother animals."¹⁶ Washburn cites hundreds of studies, published in various biology journals between 1900 and 1926, that attempt to answer questions about animals' cognitive abilities, learning processes, sensory perceptions, and conscious experiences.

But though she is sanguine about the field's accomplishments, she is quick to note the epistemological difficulties that arise from comparative psychology. To begin with, the

¹⁵ Russell, *My Philosophical Development*, 95-6.

¹⁶ Washburn, *The Animal Mind*, 22; subsequent references cited in text as *AM*.

assumption that animals have minds—or even that other humans have minds—is an inference on which the whole of psychology rests, and yet one that cannot be proven. “The science of human psychology,” she writes, “has to reckon with this unbridgeable gap between minds as its chief difficulty” (*AM* 1). The gap between human minds is unbridgeable—the psychologist can never enter into another person’s consciousness to examine it. The gap between the human psychologist and the animal mind, however, is even larger. Washburn says,

If my neighbor's mind is a mystery to me, how great is the mystery which looks out of the eyes of a dog, and how insoluble the problem presented by the mind of an invertebrate animal, an ant or a spider! We know that such minds must differ from ours not only in certain individual peculiarities, but in ways at whose nature we can only guess. . . . [W]hen we find sense organs, such as the compound eyes of insects or crustaceans, constructed on a plan wholly diverse from that of ours; when we find organs apparently sensory in function, but so unlike our own that we cannot tell what purpose they serve,—we are baffled in our attempt to construct the mental life of the animals possessing them, for lack of power to supply the sensation elements of that life. ‘It is not,’ said Locke, ‘in the power of the most exalted wit or enlarged understanding, by any quickness or variety of thought, to invent or frame one new simple idea in the mind’ (584, Bk. II, ch. 2); we cannot imagine a color or a sound or a smell that we have never experienced; how much less the sensations of a sense radically different from any that we possess! (*AM* 2-3)

Washburn makes two key claims here. First, the degree of distance between humans and other species—whether measured morphologically, physiologically, or phylogenetically—corresponds in some measure to the degree of difficulty in understanding their mental lives. It might be relatively easy to imagine a dog’s consciousness, or a chimpanzee’s; but when it comes to creatures like insects and crustaceans, creatures radically different from us, it is difficult or even impossible to imagine what their consciousness is like. Second, many creatures have sense-organs and sensory abilities quite different from our own, and can perceive stimuli of which we are unaware, or perceive them in unimaginable ways. We cannot, after all, imagine a new color; nor can we imagine sounds beyond our range of hearing or smells beyond our own experience. Yet many of the animals that animal psychologists study *do* register these perceptions. We

cannot, therefore, assume that our own human view of the world is true and complete; we must recognize that many animals have experiences, and perhaps even something like knowledge, which we lack.

Washburn's textbook is indebted to many biologists and psychologists, but perhaps none more than Conwy Lloyd Morgan. Morgan, who studied under Charles Darwin's protégé George Romanes, is one of the most important figures in early animal psychology and animal behavior studies. His *Animal Life and Intelligence* (1891) and *Introduction to Comparative Psychology* (1896) are foundational texts for the field. Morgan insisted that perception was the most important aspect of animal mind. "The sense-experience," he writes, "forms the foundation of our psychical life; and it can hardly be questioned that it forms the foundation of the psychical life of animals."¹⁷ Morgan did not believe that animals other than humans could reason or form abstract concepts, and therefore animals' mental lives were ruled by sensations, perceptions, and memories of earlier sensations and perceptions. This belief in animals' lack of reason or abstract thinking led H.G. Wells, in an otherwise positive review of *An Introduction to Comparative Psychology*, to poke fun at Morgan for a certain lack of imagination. Wells says,

[T]he dog, possessing... a power of olfactory discrimination infinitely beyond our own, may have on that basis a something not strictly 'rational' perhaps, but higher than mere association and analogous to and parallel with the rational. It may even be that Professor Lloyd Morgan's dog, experimenting on Professor Lloyd Morgan with a dead rat or a bone to develop some point bearing upon olfactory relationships, would arrive at a very low estimate indeed of the powers of the human mind.¹⁸

Wells is not entirely fair here, for Morgan, like Washburn, was sensitive to the differences in perception among species. These differences made him reluctant to make too

¹⁷ Morgan, *Introduction to Comparative Psychology*, 157; subsequent references cited in text as *ICP*.

¹⁸ Wells, "The Mind in Animals," 683.

definitive of claims about animals' sensory experience. He writes that ants and bees "have probably senses of which we are wholly ignorant."¹⁹ In bees,

[i]t is not improbable that the ocelli serve mainly the purpose of directing the insect to a glimmer of light, the opening of the nest, for example; while the method of vision in the many-faceted eyes, the so-called mosaic vision, is quite different from anything of which we have or can have experience.... Does it not, therefore, logically follow that the visual experience of the bee must differ so widely from our own, that our wisest course is an honest confession of ignorance? (*ICP* 158)

And later, he writes,

If then the tactual field must be somewhat different from ours, the visual field widely different, and the antennary field—not improbably the dominant factor in bee-experience—quite unknown, must not one infer that the nature of the sense-experience of this insect is a secret she keeps to herself, even if she be philosopher enough to fancy she has guessed it? (*ICP* 159)

Morgan qualifies his speculation about the functions of bee sense organs and the nature of bee experience through the litotic phrases "not improbable" and "not improbably." After each of these hypotheses, Morgan distances himself from them even further by claiming ignorance and suggesting that it would be impossible to verify them, because bees are simply too different from us. Yet he clearly found them important enough to publish, even if they are unverifiable. There is a kernel of knowledge about bees' lives in these passages, but Morgan emphasizes that his claims are only hypotheses which cannot be empirically tested and confirmed.

Morgan introduces the terms "constructs and worlds" to describe animal experience and decenter human perspectives. He writes in *Animal Life and Intelligence* that we, like animals, mentally construct our ideas of objects based on sense-stimuli and memories of earlier sense-stimuli. This is not to say that there are no real objects in the world independent of us, but that we can only know them through the mediation of our mental constructs. Animals, however, which have different sensory abilities, instincts, and cognitive capacities, are likely to have

¹⁹ Morgan, *Animal Life and Intelligence*, 356; subsequent references cited in text as *ALI*.

different constructs from our own and from each other's. To emphasize these distinctions, Morgan invokes the plural term "worlds."

[W]e must remember that it is not merely that the same world is differently mirrored in different minds, but that they are two different worlds. If there is any truth in what I have urged in the last chapter, we *construct* the world that we see.... The question, then, is not—How does the world mirror itself in the mind of the dog? but rather—How far does the symbolic world of the dog resemble the symbolic world of man? (*ALI* 336)

Morgan suggests in this passage that it would be wrong and unproductive to assume that we, as humans, have objective knowledge of the world, and to ask what subset of our own knowledge the dog shares. Instead, both humans and dogs construct worlds; both worlds are mediated by the subject's biology, and neither is more or less real than the other.

In fact, according to Morgan, our human constructs often get in the way of scientific practice. Even though psychologists attempt to adopt an objective stance toward their animal subjects, they cannot avoid the subjective biases associated with their own human status: "The main difficulty in conceiving the mental state of animals,' says [P.G. Hamerton], 'is that the moment we think of them as *human* we are lost.' Yes, but the pity of it is that we cannot think of them in any other terms than those of human consciousness. The only world of constructs that we know is the world constructed by man" (*ALI* 335). Morgan believes that the subjective experiences of other species warrant studying, but that our human vantage points mean any conclusions we draw can only be provisional. In his *Introduction to Comparative Psychology*, he even declares that he will restrict himself "to a consideration of the psychological states which we may infer to be associated with the functional activity of the cerebral hemispheres in the higher vertebrates" (41). In other words, he will not even attempt to give an account of the psychology of mollusks, arthropods, or other remote creatures, because their morphological and

physiological differences from humans make it practically impossible to determine what their psychic lives are like.

This problem of how to study animal constructs when burdened with human constructs led Morgan, late in his career, to express doubts about the scientific method itself. He wrote in 1912 to the ornithologist Henry Eliot Howard, “I often think that a sort of unanalyzed sympathetic artistic sense sets a man nearer to the secret of the animal mind than scientific thought which is at home in the midst of a more intellectual mode of psychological development.”²⁰ Intuition, he suggested, might get us just as close to understanding animal minds as scientific practice does. We might even say that Morgan came to lose faith in the possibility of a scientifically reliable form of empathy, and instead placed his faith in the empathic possibilities of art.

Many biologists who followed Morgan were even more reticent to make claims about animals’ subjective experience.²¹ Some went so far as to openly declare what Morgan hinted at late in his life: that subjective experience should not be part of the domain of science at all. John B. Watson, the founder of behaviorism, declared in 1913 that psychology should be purely experimental. He wrote, “One can assume either the presence or absence of consciousness anywhere in the phylogenetic scale without affecting the problems of behavior by one jot or tittle; and without influencing in any way the mode of experimental attack upon them.”²² By the 1930s, the famous Dutch ethologist Niko Tinbergen had also come to believe, in

²⁰ Quoted in Burkhardt, *Patterns of Behavior*, 94-5.

²¹ Alan Costall has argued that while Morgan himself believed in continuity between human and animal minds, and thus in animal consciousness, he was nevertheless an inadvertent key figure in the transition to behaviorism, which refused to attribute animal behaviors to states of consciousness. See “Lloyd Morgan and the Rise and Fall of ‘Animal Psychology’” for his account of Morgan’s role in the history of animal psychology.

²² Quoted in Burkhardt, “The Founders of Ethology and the Problem of Animal Subjective Experience,” 2.

contradistinction to his psychologist mentors, that biology should disregard the problem of subjective experience in favor of an objectivist stance toward animal behavior. Rather than posing questions about what animals felt, thought, or sensed, Tinbergen encouraged ethologists to focus on observable behaviors, for instance, whether particular motor sequences were variable or invariable. This belief would be a bone of contention between him and Julian Huxley for several decades. Huxley wrote in 1923, and maintained throughout his career, “it is a very foolhardy ‘behaviorist’ indeed who denies the existence of emotion and conscious process!”²³

The debate between subjectivist animal psychologists and objectivist behaviorists would continue to dominate the fields of ethology and animal psychology through the modernist period.

In the postwar period, the behaviorist position largely won out.²⁴ The discipline of ethology, which gained scientific legitimacy in the 1950s under the leadership of Tinbergen and Konrad Lorenz, adopted a methodology geared towards objective observations of behavior rather than the investigation of subjectivity. By 1974, the philosopher of science Thomas Nagel could write that scientific-reductionist accounts of consciousness would never explain “the subjective character of experience.”²⁵ In other words, he contended that science could never tell us what it is like to be a bat or any other nonhuman creature. Contemporary cognitive science has developed new tools for studying mind, such as functional MRI, which maps neural activity in the brain. But the *experience* of animal consciousness remains, in large part, outside the scope of

²³ Huxley, *Essays of a Biologist*, 109.

²⁴ Richard W. Burkhardt, Bernard Rollin, and Eileen Crist have given excellent historical accounts of how animals’ subjective experience came to be excluded from science. While Burkhardt attributes the change primarily to the ethologists Tinbergen and Lorenz, Rollin attributes it to behaviorist psychologists, and Crist to the idioms of classical ethology and sociobiology. See Burkhardt’s “The Founders of Ethology and the Problem of Animal Subjective Experience,” Rollin’s “Animal Mind: Science, Philosophy, Ethics,” and Crist’s *Images of Animals*.

²⁵ Nagel, “What is it Like to Be a Bat?” 436.

such research. The neuroscientist Joseph LeDoux writes in a 2005 speculative essay, “I believe that animals have feelings and other states of consciousness, but neither I nor anyone else has been able to prove it.”²⁶ It is a statement that Morgan might have written a century earlier.

The subjectivist position came, under the influence of the behaviorists and the classical ethologists, to seem less than scientific. But in recent years, some zoologists have begun to swing away from the behaviorist pole and back toward the kind of subjectivism that characterized animal psychology in the modernist period. Cognitive ethology, a new field pioneered by Donald R. Griffin in the 1970s, studies the relationship between animal behavior and consciousness. Marc Bekoff, for example, combines scientific method with empathic epistemology, writing that in his research, “I become coyote, I become penguin. I try to step into animals’ sensory and locomotor worlds to discover what it might be like to be a given individual, how they sense their surroundings, and how they behave and move about in certain situations.”²⁷ Researchers in this field imagine animal perspectives just as Woolf, Haldane, and Morgan did. Not all scientists agree that cognitive ethology’s questions and methods are sufficiently rigorous, but the field’s growth reflects a return of the kind of subjectivism that comparative psychologists and thinkers across disciplines embraced at the turn of the twentieth century. Now, as in the modernist period, the study of animal experience has both scientific legitimacy and cultural currency.

Bertrand Russell and the Philosophy of Perspectivism

Bertrand Russell was not a biologist, but a trained mathematician, a philosopher, and a popularizer of modern physics. Russell is best-known today for his *Principia Mathematica*

²⁶ In John Brockman, *What We Believe But Cannot Prove: Today’s Leading Thinkers on Science in the Age of Certainty*, 132.

²⁷ Marc Bekoff, *Minding Animals*, 11.

(1910-1913), co-authored with Alfred North Whitehead, and for his various works on modern politics and modern science. But first and foremost, Russell was a philosopher, and in the period from 1912 to 1921 he developed a philosophy founded on sensations and perspectives. Russell's early work disentangled the concept of "perspective" from the human subject, while *The Analysis of Mind* (1921) extended concepts borrowed from animal psychology to the human animal. Russell's forays into philosophy and psychology show that he rejected the common-sense concept of the mind and envisioned instead a zoomorphic human subject, modeled after the bare subjects of animal psychology.

Russell's philosophy, which grows out of the empiricist tradition, reconceptualizes the physical world through the language of the senses. He outlines, in *Our Knowledge of the External World* (1914) and "The Relation of Sense-Data to Physics" (1914), an account of physical matter *as* sense-data. We are used to thinking of a physical object, such as a table, as a solid, unchanging thing that merely appears different depending upon where we are standing. A person standing at the head of a table receives different sensory impressions of it than a person standing to its side, but we don't think of this as any indication that the table itself is different. Russell, however, argues that the "table" *is* in fact a series of related sense-data, and not a single, consistent object. "All the aspects of a thing are real," he writes, "whereas the thing is a mere logical construction."²⁸ Russell regards sense-data "as not mental, and as being, in fact, part of the actual subject-matter of physics."²⁹ It is sense-data, rather than matter (or mind), that is the substance of the world.

²⁸ Russell, *Our Knowledge of the External World*, 94; subsequent references cited in text as *KEW*.

²⁹ Russell, *Mysticism and Logic*, 149.

Russell thus posits that the world is a system of perspectives. By “perspective,” however, he does not mean a psychological perspective belonging to a conscious subject, but instead a spatial, geometric perspective. In *The Analysis of Mind*, he clarifies that a perspective can, but need not, be occupied by a human or a living thing. Photographic plates, he suggests, afford the best example of a non-mental entity with a perspective; they receive and record sense-data with no semblance of a mind.³⁰ When perspectives *are* inhabited by subjects, Russell considers these subjects more similar to the photographic plate than to any traditional concept of self. The subject, for him, is not a pre-existing entity that *has* sensations; instead, experiences of sense-data *constitute* the subject (*AoM* 13). As Ann Banfield argues in *The Phantom Table*, one of the central goals of Russell’s philosophical project is to “par[e] down the I.”³¹ Russell’s philosophy, in an attempt to do just that, works toward reenvisioning the subject as the perspective, a concept that levels out human, animal, and mechanical points of view. Traditional psychological subjects are nowhere in Russell’s world, but subjectivity is everywhere.

Russell distinguishes semantically between perspectives that are inhabited by a human or animal subject and those that are not, using the term “private worlds” to describe the former (*KEW* 93). Like Morgan before him and Haldane after, Russell sees in the plurality of “worlds” a more apt designation than the singular “world” to describe the things around us.³² “Worlds” and “perspectives” emphasize that there is no single perfect, objective world or perspective. They also minimize the contribution of the subject or mind in favor of the subject’s position. Worlds

³⁰ Russell, *The Analysis of Mind*, 129-131; subsequent references cited in text as *AoM*.

³¹ Banfield, *The Phantom Table*, 162.

³² The rhetoric of “worlds” perhaps reaches its apex in the writing of German biologist Jakob von Uexküll, who uses the term *Umwelten* to describe the meaningful aspects of the environment for different animals, or the ways that different animals create a world from their environment. See Uexküll’s *Foray into the Worlds of Animals and Humans* (first published in German in 1934).

function as spaces that the subject may inhabit and outlooks that the subject may take, but exist prior to and independent of the subject itself.

Russell's philosophy of the external world might lead us to think him an unabashed materialist and a disbeliever in "mind." While he does express skepticism about concepts such as "consciousness" and "self," Russell is not quite the advocate of impersonality and reductionist materialism that he might seem from the discussion above (*AoM* 9-26). In fact, Russell took a "psychological turn" around 1918 in preparation for writing *The Analysis of Mind*, and his foray into psychology depended crucially on the interventions of the animal psychologists. The trajectory of Russell's writings between 1912 and 1921 is, first, to tear down the traditional understanding of "subject, object, and the nature of reality" (to borrow Woolf's terms) through the philosophy of perspectivism, and then to build a new understanding of the subject that is sparer and more zoomorphic than the old one.

Russell began studying psychology around 1918, and read the works of many animal psychologists including Thorndike, Washburn, Morgan, and Watson.³³ Watson plays a major role in *The Analysis of Mind*, and what Richard F. Kitchener calls a "flirtation with behaviorism" is a central act in Russell's psychological turn.³⁴ Watson called for psychology to be an objective science, to reject introspective methods of investigation in favor of external ones, and to make behavior rather than mental states its object of study. He ran his psychological experiments on rats without caring about the rats' conscious processes; the psychology of humans, he argued, should similarly "dispense with consciousness."³⁵ Mental states, in his schema, could be reduced

³³ Russell's list of "Philosophical books read in prison" (1918) includes Washburn's *The Animal Mind*, along with many works on human psychology; *The Analysis of Mind* cites Thorndike, Morgan, and Watson.

³⁴ See Kitchener, "Bertrand Russell's Flirtation with Behaviorism."

³⁵ John B. Watson, "Psychology as the Behaviorist Views It," 176.

to “faint throat, chest, and laryngeal movements.” Thinking was, he insisted, a physiological activity not qualitatively different from playing tennis.³⁶

Russell found behaviorism attractive because he, too, doubted the existence of consciousness as it is normally conceived, more particularly of a conscious self. In this doubt, he was influenced not just by Watson, but also by Franz Brentano and William James, two of the “empiricist psychologists” that, Judith Ryan has argued, contributed to the turn-of-the-century redefinition of the subject as “a fluid, unbounded self essentially composed of sense impressions, a self that was not distinct from its surroundings.”³⁷ Consciousness, unlike behavior, is not empirically observable, and Russell thought that any philosophy or science worth its salt should not assume its existence a priori. Furthermore, behaviorists go further than any other school in cutting out the “I” and all the presuppositions that go along with it, and as we have seen, “paring down the I” is a central part of Russell’s philosophical project.

Yet Russell stops short of the behaviorists, and his account of mind ends up closer to that of animal psychologists like Morgan than to that of Watson. In his attempt to pare down the concept of mind, Russell reaches two irreducible parts: sensations and images (remembered or re-experienced sensations). The latter is an exclusively mental phenomenon, corresponding to nothing in the observable world, and thus inadmissible to the behaviorists (*AoM* 144-152).

Russell also argues, against the behaviorists, that introspection has some small part to play in the practice of psychology, because we have certain private sensations (such as feelings in our own

³⁶ Watson, “*The Analysis of Mind*, Bertrand Russell,” 98; quoted in Kitchener, “Bertrand Russell’s Flirtation with Epistemology,” 281-282.

³⁷ Judith Ryan, *The Vanishing Self*, 12. Ryan’s arguments about empiricist psychology, its revision of the concept of the self, and its influence on literary modernism correspond closely with my own; but she does not delve into comparative psychology or representations of animal minds, whereas I think comparative psychology’s notion of animal subjectivity was a crucial means for disseminating ideas about the subject of sensation into modernist culture at large. For Brentano and James’s influence on Russell, see *The Analysis of Mind*, 9-26.

bodies) that cannot be observed externally but are nevertheless real (*AoM* 117). In short, Russell diverges from the behaviorists because he believes in an internal mental life. This mental life is, at its heart, nothing more than sensations and their echoes, but for Russell it is real and it is not explicable through external observation and behaviorist assumptions alone.

Like most animal psychologists (behaviorist or subjectivist), Russell strongly believes that humans' and animals' mental lives are not qualitatively different. He encourages his readers “to remember that from the protozoa to man there is nowhere a very wide gap either in structure or in behaviour. From this fact it is a highly probable inference that there is also nowhere a very wide mental gap” (*AoM* 41). Assuming mental continuity among all species, Russell contends that “there is probably more to be learnt about human psychology from animals than about animal psychology from human beings” (*AoM* 43). What many psychologists would agree is true of other species—that their experience is passive, composed of sensations (present and past), and not subordinated to a coherent, well-developed ego—Russell argues is true of humans as well.

Russell thus applies animal psychology to humans in order to create a vision of the human that is more in accord with modernist versions of subjectivity, particularly Woolf's.³⁸ Recasting mind in terms of perspective and perception, Russell's works elevate sensation and images themselves at the expense of the thinking, experiencing subject. We learn, from studying animals, that we are like them; despite our belief in our own mental prowess, complicated

³⁸ In this claim I am in agreement with Banfield, who identifies parallels between the Russellian and Woolfian subjects (though Banfield does not address the role of animal psychology's ideas about subjectivity in contributing to these parallels). Timothy Mackin, in “Private Worlds, Public Minds,” has made a counterargument that Woolf disagrees with Russell's ideas about private worlds and mental life, saying, “Woolf clearly does have her suspicions of the ‘I,’ but that doesn't mean she is willing to abandon the personal” (121). I think Mackin is right about Woolf, but wrong about Russell. Despite Russell's desire to get rid of concepts like “consciousness” that are not empirically verifiable, he never quite eradicates the personal—it remains a key part of his theory of mind in the form of private sensations and images.

intellect, and well-formed selfhood, we are actually, like the animals, no more than bundles of sensations and images, open to and largely constituted by the sense-data of the external world.

J.B.S. Haldane and the Epistemology of Animals

J.B.S. Haldane was a physiologist who is best known today for his work in population genetics and his role in the modern evolutionary synthesis, which showed how Mendelian genetics and natural selection were consistent principles that, in combination, could largely explain the process of evolution. Haldane was, however, more than just a laboratory biologist. He was also a public intellectual, an active socialist, and the author of numerous essays on science written for the general public, of which “Possible Worlds” is one. At first glance, Haldane seems to embody what C.S. Lewis and others called “scientism”—a myopic belief in the sufficiency of science to replace other kinds of philosophical inquiry and political action. After all, Haldane spoke openly about his distrust of religion and his belief that political progress would accompany scientific progress.³⁹ Yet there is another side to Haldane as well; “Possible Worlds” evokes an author who is wary of science’s promises of knowledge and objectivity, reflective about his own subject position, and creative in his attempts to understand and represent the natural world.

³⁹ See C.S. Lewis’s “A Reply to Professor Haldane,” written in response to Haldane’s 1946 review of Lewis’s *Space Trilogy*. Lewis defines scientism in this essay as “the belief that the supreme moral end is the perpetuation of our own species, and that this is to be pursued even if, in the process of being fitted for survival, our species has to be stripped of all those things for which we value it—of pity, of happiness, and of freedom” (77). Though this definition is more narrow than the one I give above, it reflects Lewis’s concern that scientific theory—in this case, natural (and artificial) selection—will be inappropriately applied to social and political ends. Lewis expresses suspicion of “scientific planning,” which Haldane endorses, because “[u]nder modern conditions any effective invitation to Hell will certainly appear in the guise of scientific planning” (80).

Haldane was a friend and sometimes antagonist of Russell's—though they disagreed many times throughout their careers, both were deeply interested in perspectivism and in the philosophy of science.⁴⁰ I think it likely that Haldane borrowed the title of his 1927 essay “Possible Worlds” from Russell, who uses the phrase in *Our Knowledge of the External World* when claiming that the goal of philosophy and mathematics is to describe not just the actual world in which we live, but all possible worlds (186). Russell credits Leibniz with the concept, and it is of course possible that Haldane came to Leibniz's concept independently rather than through Russell. Yet I think that we can read “Possible Worlds” as Haldane's response to Russell's philosophy, to the possibilities and challenges that Russell's perspectivism opens up for science.

Haldane's essay bears the impression not just of Russell's influence, but also of the animal psychologists'. Haldane cites two biologists interested in animal psychology in the essay. The first is Julian Huxley, an expert on bird psychology, though it is his “Philosophic Ants” that is Haldane's direct inspiration in “Possible Worlds.” The second is Lord Dunsany, “who has given us the most vivid imaginative picture of insect psychology in our language” in *The Flight of the Queen* (PW 270). Haldane himself was neither an animal psychologist nor an ethologist; most of his professional scientific work was in physiology and genetics. And he refers to “our present ignorance of animal psychology” in “Possible Worlds,” suggesting that he was either unaware of or unimpressed by the field as it stood in 1927. But according to his biographer,

⁴⁰ For example, Russell responded to Haldane's lecture *Daedalus, or Science and the Future* with *Icarus, or the Future of Science*, in which he counters Haldane's general optimism over scientific progress. Haldane, for his part, criticized Russell's *Analysis of Mind* because it “arrive[s] at a real world vastly more complicated than that of physics, even though it finds no room for purpose” (*Possible Worlds* 128-9). Though their differences are important, for my purposes the similarities in their philosophies are even more important, namely their commitment to empiricism, rejection of solipsism, and use of the language of perspectivism.

Krishna R. Dronamraju, he was interested in animal behavior and psychology. Haldane even wrote, in a 1953 letter to Russell himself, about his late work “decoding” bee language and describing bee dances as a propositional function.⁴¹ I make no claims that Haldane read the work of C. Lloyd Morgan or other founding figures of animal psychology. But I would suggest that, through his connections at Oxford and Cambridge and through his friendship with Julian Huxley, Haldane probably knew about the development of animal psychology and ethology during the 1920s, and that they were direct or indirect influences on “Possible Worlds.”

“Possible Worlds” explores the epistemological consequences of animal perspectives, asking what happens to science once we take seriously the species-bound nature of our empirical processes. The essay is inspired by Julian Huxley’s “Philosophic Ants: A Biologic Fantasy” (1922). “Philosophic Ants” begins with a fable of intelligent ants, ectothermic creatures whose rate of activity depends on temperature, trying to make sense of their oddly-rhythmed world and progressing from religious to scientific explanations for why some days seem longer than others. This bit of fiction paves the way for Huxley’s reflections on “biological relativity,” on the fact that “we are but parochial creatures endowed only with sense-organs giving information about the agencies normally found in our own little environment.”⁴² “Possible Worlds” develops Huxley’s thread of thinking, as Haldane grapples with the realization that human knowledge is necessarily limited and subjective, and that the human senses on which empiricism is based cannot give us a complete and impartial understanding of the world. As a dedicated scientist, Haldane must reconcile this skepticism about the empiricist subject with his faith that human knowledge can still be expanded and made more reliable through scientific practice.

⁴¹ Bertrand Russell, *Autobiography*, 585.

⁴² Julian Huxley, *Essays of a Biologist*, 161.

Haldane declares early in his essay that he wants to reexamine some of our assumptions about the nature of reality by “considering whether a plausible world or a coherent experience might not exist in which they are not fulfilled” (*PW* 261). He aims, then, to challenge common sense through a series of thought experiments in which he constructs hypothetical “possible worlds.” The first two of these possible worlds draw more on physics than on biology—Haldane imagines himself into a Riemann’s space in which Euclidian geometry does not apply, and then into a world in which time is experienced differently. What if, he suggests, the relationship between our experience of time and our personal identity were loosened, such that we might remember being two different people, or two different people might remember being the same person?

This second possible world leads Haldane into the realm of biology, for some species can undergo fission, while in other species different individuals can fuse together. The memory of a flatworm or protozoan, if they can have any memory at all, would resemble that of Haldane’s hypothetical subjects. It is in this example that Haldane moves from psychophysics to biology, and to his real interest in this essay: dreaming up hypothetical creatures. “How does the world appear to a being with different senses and instincts from our own?” he asks, “and if such beings postulated a reality behind these appearances, what would they regard as real?” (*PW* 264-65). The essay goes on to explore how a dog, barnacle, and bee, endowed with different senses and instincts, might perceive and make sense of the world.

Of the many examples in “Possible Worlds,” the “philosophical barnacle” offers the best illustration of the link between sensory biology and knowledge. The barnacle is rooted to a surface, though it can move its arms and stalks to “explore a sharply limited volume of space” (*PW* 276). It has a crude sense of sight and of direction, but no more.

‘The world,’ it says, ‘is what we can sweep with our arms. Things come into it, and my visions are of some use to me in telling me of things that will come into being in it, but they are notoriously deceptive. I know that when a vision becomes very large it is time for me to shut my shell, though sometimes even a very large vision does not portend any real event.... Visions are visions and realities are realities, and no good will come of mixing them up.’ (*PW* 277)

Haldane fancifully endows the barnacle with language to speak and a philosophy that distinguishes between visions and reality, but beneath this anthropomorphism lies a foundation of barnacle sense-experience. A “bare subject” constructing its world from sensations past and present, the barnacle has no innate knowledge; it, like us, must build its suppositions and patterns of behavior from experience. The passage shows that there is nothing innate or inevitable about associating seeing with believing. Had we evolved to have poor eyesight and excellent senses of hearing or smell, we would structure our world and even our notion of reality differently.

To give another example, Haldane describes how instincts would lead a bee to think, if it could think abstractly, that duties are the principal component of reality and objects only a secondary component. “I do not see why we should deny the bee the reality of her duty world,” he declares. “Duties are, I suspect, as real as material things, which is not perhaps saying much” (*PW* 273). The claim echoes Morgan, who refused to consider the human’s world any more real than the dog’s world. Haldane considers psychology a part of biology too, as “real” as the stuff of anatomy and physiology. Bees have evolved to be highly instinctual creatures, but this biological explanation does not supersede the reality of their emotional lives (*PW* 270). Haldane may be exaggerating when he grants the barnacle speech and the bee a philosophy, but he is attempting to articulate the experiences associated with sensory stimuli and instincts in the animal mind, and he is quite earnest in insisting that these minds deserve serious study.

The point of these mental exercises is to demonstrate that our knowledge depends upon *our* senses and instincts, that our perspective is one among many. Even further, our knowledge is

thus limited by our point of view and our biology. “[M]y own suspicion,” Haldane says, “is that the universe is not only queerer than we suppose, but queerer than we *can* suppose” (*PW* 286). In other words, while we can make progress in debunking common sense and imagining other perspectives, eventually we will hit a wall—our knowledge will at some point be limited by our own biological capacities. Yet he also remains optimistic about the future of science because there is still much to be done in the way of taking other perspectives into account. Though “our present ignorance of animal psychology” means that his hypothetical creatures are probably far from their real-world counterparts, the qualifier “present” suggests that Haldane believes we will better understand animal psychology in the future (*PW* 285). When we “look at [the universe] from as many different points of view as possible,” we should include the points of view of real as well as imaginary animals (*PW* 285-6).

“Possible Worlds” is itself not a work of animal psychology, but instead a theoretical exercise in constructing knowledge from different subject positions. Yet Haldane is indebted to animal psychologists for their insistence that science should study subjective experience in addition to more objective data, and that introspection and speculation should be part of scientific thinking as well as experimentation and data collection. The scientist’s perspective, according to Morgan, is already subjective, conditioned by his or her human frames of reference and human senses. But Haldane agrees with Russell that we *can* garner knowledge from other points of view. We remain, like the barnacle, rooted in our own perspectives, but we can stretch outside of them. Haldane responds to the concerns of animal psychologists by modeling a more reflective kind of scientific thinking in which the scientist, rather than striving for absolute objectivity, instead strives to contextualize his or her own perspective within a larger system.

Virginia Woolf and the Aesthetics of Animal Experience

Virginia Woolf wrote frequently about animals, and works like “The Mark on the Wall,” “Kew Gardens,” and *Flush* reveal the way that animal psychology’s ideas about nonhuman minds filtered into her animal representations. Woolf scholars over the last two decades have begun to attend to Woolf’s interest in “nature,” animals, and biology. The role of butterflies and moths in her writing has received attention from Rachel Sarsfield, Harvena Richter, and Christine Froula.⁴³ Gillian Beer has traced the influence of Darwinian ideas of time in Woolf’s work; Bonnie Kime Scott analyzes Woolf’s fraught relationship with Victorian natural history practices; and Christina Alt puts Woolf’s representations of animals and plants in conversation with twentieth-century ecology, ethology, and natural history.⁴⁴ Many of the contributors at the 2010 International Conference on Virginia Woolf, “Virginia Woolf and the Natural World,” discussed Woolf’s animal representations and her appropriation of evolutionary and natural history discourses.⁴⁵ But this particular conjunction of Woolf’s writing with animal psychology and its implications for human subjectivity have not yet been addressed.

⁴³ See Sarsfield’s “From the Chrysalis to the Display Case: The Butterfly’s ‘Voyage Out’ in Virginia Woolf,” Richter’s “Hunting the Moth: Virginia Woolf and the Creative Imagination,” and Froula’s “Out of the Chrysalis: Female Initiation and Female Authority in Virginia Woolf’s *The Voyage Out*.”

⁴⁴ See Gillian Beer’s *Virginia Woolf: The Common Ground* (6-28), Bonnie Kime Scott’s *In the Hollow of the Wave* (42-70), and Christina Alt’s *Virginia Woolf and the Study of Nature*.

⁴⁵ See *Virginia Woolf and the Natural World: Selected Papers from the Twentieth Annual International Conference on Virginia Woolf*. Of particular interest are Diana Gillespie’s “‘The Bird is the Word’: Virginia Woolf and W.H. Hudson, Visionary Ornithologist” and Jeanne Dubino’s “Evolution, History, and *Flush*; or, The Origin of Spaniels.” Some of the papers from the 2006 International Conference on Virginia Woolf are also of interest; see Ian Blyth’s “Woolf, Rooks, and Rural England,” Richard Espley’s “Woolf and the Others at the Zoo,” Christina Alt’s “Pests and Pesticides: Exploring the Boundaries of Woolf’s Environmentalism,” and Jane Goldman’s “‘Ce chien est à moi’: Virginia Woolf and the Signifying Dog” in *Woolfian Boundaries: Selected Papers from the Sixteenth Annual International Conference on Virginia Woolf*.

Woolf's efforts to represent and reconceive subjectivity are perhaps the most recurrent theme in Woolf criticism.⁴⁶ Some recent critics have argued, against the grain, that Woolf's writings challenge traditional notions of self not by elevating the human subject and making it the central object of study, but by diminishing it. Douglas Mao argues, in *Solid Objects*, that Woolf privileges the object world over that of the subject because she has tired of human subjectivity (as it is normally understood and represented). Modernity, suggests Mao, for figures like Woolf "could be construed as an affair of consciousness gone awry, a phenomenon of subjectivity grown rapacious and fantastically powerful."⁴⁷ And human consciousness is always inflected—even dominated—by ideology, along with "the peculiar species of fatigue" that ideology elicits.⁴⁸ In Mao's account modernists like Woolf, mistrusting human subjectivity and weary of human consciousness, turned to the object world for relief. Objects, strange and inhuman, seemed to offer some respite from the overgrown and sometimes even violent human ego.

⁴⁶ A comprehensive literature review of works on Woolf and subjectivity is impossible within the space of this chapter, but I will mention some books and articles that I believe offer a good sense of the field. Deborah Parsons, in *Theorists of the Modernist Novel*, offers a recent and clear articulation of the critical position that Woolf was aiming for subjective realism, tying this goal to new psychoanalytic understandings of self. Patrick J. Whiteley, in *Knowledge and Experimental Realism in Conrad, Lawrence, and Woolf*, and Roxanne J. Fand, in *The Dialogic Self*, offer interesting discussions of the "permeability" of self in Woolf's writings, though they are more interested in how Woolfian minds are permeable to one another than to how they are permeable to the external object world. Michael Levenson's *Modernism and the Fate of Individuality* and Makiko Minow-Pinkney's *Virginia Woolf and the Problem of the Subject* connect Woolf's fluid and multiplicitous subjectivities with her feminism and her representations of gender. Tamar Katz, in "Modernism, Subjectivity, and Narrative Form," argues that Woolf's work (in particular *The Waves*) stages a showdown between an abstract, transcendental model of subjectivity and a worldly, socioculturally-influenced one. Finally, Bill Brown emphasizes Woolf's representations of the external world rather than the inner life, declaring in "The Secret Life of Things (Virginia Woolf and the Matter of Modernism)" that her novels and stories "foreground the way *objects* mediate human relations, including the self's relation to itself" (13; my emphasis).

⁴⁷ Mao, *Solid Objects*, 8.

⁴⁸ *Ibid.*, 9.

While Mao reads in Woolf's work a rejection of subjectivity, Ann Banfield identifies a reduction of subjectivity instead. Banfield argues that Woolf borrows from Bertrand Russell an interest in the "reduced self" of momentary experience, a subject that is less developed and less permanent than the individual as we usually think of him or her. According to Banfield, Woolf (like Russell) attempts to represent a kind of subject that receives impressions and sensations from the world without being weighed down by the ordinary trappings of personality and character. I would add to Banfield's argument that Woolf envisions subjectivity in much the same way that biologists and psychologists describe animal consciousness—as a vessel of perceptions and sensations, rather than a thinking mind pursuing abstract ideas and rational processes of thought. Russell, too, had argued that human subjects really are, like animal subjects, little more than bundles of sensations and images, open to and largely constituted by the sense-data of the external world. But to *feel* ourselves as such is the task Woolf takes on in her fiction.

Woolf's short story "The Mark on the Wall" (1917) offers a sense of her weariness with human subjectivity and her interest in an alternative model of bare subjectivity. The story relates the thoughts of an unnamed narrator as she observes a mark on the wall in her living room and wonders what it might be. Though her thoughts begin with, and periodically return to, the mark, they spin out dizzily into other topics—lost possessions, Shakespeare, self-reflection, memories of Sundays, the South Downs, the nature of knowledge, trees. The narrator feels troubled by the rapid upheaval of her thoughts. Only when another character speaks and identifies the mark on the wall as a snail do the narrator's speculation and the story end. Human thinking, in this story, takes on an exhilarating trajectory, yet it disturbs the narrator. "The inaccuracy of thought!" she despairs at one point; later, she muses, "I want to think quietly,

calmly, spaciouly, never to be interrupted, never to have to rise from my chair, to slip easily from one thing to another, without any sense of hostility, or obstacle.”⁴⁹ But thought is not so accommodating, manifesting itself in stormier ways: “Everything’s moving, falling, slipping, vanishing...” (*CSF* 83). Though one might be tempted to read “The Mark on the Wall” as a celebration of modernism’s new techniques for representing consciousness, the story betrays a deeper doubt about the experience of human consciousness itself, for thought is “inaccurate,” confusing, and tempestuous. Modernists like Woolf sought, in Mao’s words, “immunity to thinking and knowing, the noble repose that comes of being out of reach of human persuasion.”⁵⁰ So, too, does the narrator of “The Mark on the Wall” seek such repose.

The story itself encodes a potential solution to this fatigue, not just through valorizing inert objects as Mao contends, but also through imagining nonhuman forms of consciousness.

The narrator wishes for

a world which one could slice with one’s thoughts as a fish slices the water with his fin, grazing the stems of the water-lilies, hanging suspended over nests of white sea eggs.... How peaceful it is down here, rooted in the centre of the world and gazing up through the grey waters, with their sudden gleams of light and their reflections—if it were not for Whitaker’s Almanack—if it were not for the Table of Precedency! (*CSF* 81-2; Woolf’s ellipsis)

The passage, which begins with a simile describing how the narrator wishes for thought to be sharper, clearer, and under one’s control, quickly becomes derailed by the simile’s second half, in which she imagines what it is like to be a fish. What is most pleasurable for her in this passage is the moment when her thought is diverted to the fish’s underwater world and she fantasizes about the fish’s calm passivity. This fantasy suggests that it is most desirable not to be capable of exercising control over one’s own stream of consciousness and “slicing” the world with it, but

⁴⁹ Woolf, *Complete Shorter Fiction*, 78, 79; subsequent references cited in text as *CSF*.

⁵⁰ Mao, *Solid Objects*, 9.

instead to have an experience akin to the fish's. For its experience, composed of appealing impressions like the feel of the water-lilies or the look of light refracted through the water, is peaceful and passive, without intellectual struggle.

“Whitaker’s Almanack” and the “Table of Precedency,” which put an end to the daydream, refer back to an earlier part of the narrator’s internal monologue, in which she contemplates “the masculine point of view which governs our lives, which sets the standard, which establishes Whitaker’s Table of Precedency” (a table that laid out the order of rank for the English aristocracy), and which in modern times may yet “be laughed into the dustbin... leaving us all with an intoxicating sense of illegitimate freedom” (*CSF* 80). The almanac and table, then, serve as metonymies for a restrictive cultural and ideological apparatus, as well as for the frustrating vagaries of human thought—they will assert themselves and interrupt the reverie, despite the narrator’s wishes. Yet Woolf offers us glimpse of real possibility that animal consciousness, in the form of the fish, could represent an alternative model of subjective experience for people discontented with the humanist subject, its ideological determinants, and its illusory freedoms.

Towards the end of “The Mark on the Wall,” in an even longer passage, the narrator contemplates a yet more inhuman form of consciousness than that of the fish—she imagines what it is like to be a tree, how “[t]he song of birds must sound very loud and strange in June; and how cold the feet of insects must feel upon it” (*CSF* 83). She is just getting to thinking about how “[i]t is full of peaceful thoughts, happy thoughts, this tree,” and how she would like to contemplate each one of the tree’s thoughts, when she realizes that “something is getting in the way” (*CSF* 83). Once again, nonhuman consciousness becomes the serene reprieve from human thought, and the sanctuary threatened by invasive human concerns. It is clear, however, that even

in this early story Woolf is formulating a conception of nonhuman consciousness as an antidote to some of the problems arising from and within the humanist subject.

“The Mark on the Wall” also gestures toward some of the problems of knowledge stemming from perspectivism that modernist scientists like Haldane would address in their work.⁵¹ The narrator expresses a distrust of scientific and philosophical knowledge at several points in the story. “The ignorance of humanity!” she thinks to herself (*CSF* 78). “[N]othing is proved, nothing is known,” she declares.

And if I were to get up at this very moment and ascertain that the mark on the wall is really—what shall I say?—the head of a gigantic old nail... what should I gain? Knowledge? Matter for further speculation? I can think sitting still as well as standing up. And what is knowledge? What are our learned men save the descendants of witches and hermits who crouched in caves and in woods brewing herbs, interrogating shrew-mice and writing down the language of the stars? (*CSF* 81)

The narrator doubts that the empirical verification she could obtain by examining the mark more closely would qualify as knowledge on any but the most superficial level. Woolf is critical of the certitude of “learned men,” putting their epistemology on a level with the superstitions of “witches and hermits.” We might read the narrator’s accusations here against “learned men” as an undercurrent hidden in Haldane and Russell’s texts. While they insist that perspectivism allows us to reject solipsism, that we can have knowledge from outside of our own minds, the fear that this provisional kind of almost-certain knowledge isn’t good enough seems to lurk behind their claims. Only Woolf, however, actually gives voice to this fear.

Yet “The Mark on the Wall” reveals that Woolf too cares about establishing knowledge, and not simply discounting the very possibility of it. In the following passage, the narrator

⁵¹ In “Misperceiving Virginia Woolf,” James Harker addresses problems of knowledge in “The Mark on the Wall” and the rest of Woolf’s oeuvre by exploring the motif of misperception, or mistaken sensory perceptions. I agree with Harker that Woolf draws on misperception as a literary resource, and I would add that she uses tropes of misperception to cast light on the biological and epistemological limitations of the senses.

imagines not only inhabiting a strange point of view, but also attempting to construct knowledge from this vantage point:

But after life. The slow pulling down of thick green stalks so that the cup of the flower, as it turns over, deluges one with purple and red light. Why, after all, should one not be born there as one is born here, helpless, speechless, unable to focus one's eyesight, groping at the roots of grass, at the toes of the Giants? As for saying which are trees, and which are men and women, or whether there are such things, that one won't be in a condition to do for fifty years or so. There will be nothing but spaces of light and dark, intersected by thick stalks, and rather higher up perhaps, rose-shaped blots of an indistinct colour—dim pinks and blues—which will, as time goes on, become more definite, become—I don't know what... (CSF 78; Woolf's ellipses)

The passage begins by meditating on what happens “after life,” perhaps on the perspective of the corpse as it is buried and plants grow over it. But at some point, the perspective changes, shifting from the dead to a subject “born there,” “at the roots of grass.” Holly Henry suggests that the perspective here is that of an insect. I think that it could be a tree's, since a tree would grow taller over fifty years and things “higher up” might gradually “become more definite” for it, and since the narrator imagines tree consciousness elsewhere in the story.⁵² Whatever the creature inhabiting this point of view, it is one in the midst of creating knowledge from its perceptions of spaces, colors, and blots, of attempting to make inferences about whether trees and people are real entities or not. This inhuman epistemology converges uncannily with the philosophical barnacles and bees of Haldane's essay. The creature's knowledge is contingent and provisional—it cannot reach the level of certainty that “learned men” believe they have attained. Indeed, the narrator ends this train of thought with an acknowledgement of *not* knowing, implying that Woolf is not interested in recuperating absolute knowledge. Yet the passage suggests that seeking to know one's world empirically, while always an incomplete and flawed

⁵² Henry, *Virginia Woolf and the Discourse of Science*, 90. Henry also links this moment to Haldane's “Possible Worlds” through their shared focus on “multiple and alien perspectives” (90). Because she is investigating the links between Woolf's fiction and astronomy, however, she is interested in “perspectives” in relation to size and scale rather than animal minds.

project, can also be a way of engaging with that world on an aesthetic and affective level, of appreciating the “rose-shaped blots” and “pinks and blues” in one’s environment.

“The Mark on the Wall” explores the perspectives of a fish, a tree, and, of course, humans, but not of the snail on the wall itself. When another character remarks to the narrator, “All the same, I don’t see why we should have a snail on our wall,” the narrator thinks, “Ah, the mark on the wall! It was a snail,” and the story abruptly ends (*CSF* 83). To name the mark a snail is to fix it, and thus to foreclose all the other possibilities that led to the narrator’s imaginings in the first place—or so the story’s logic goes. In the later story “Kew Gardens” (1919), a story that Woolf envisioned as “dancing in unity” with “The Mark on the Wall,” the creature that was an opaque object, a stopper in the narrator’s stream of consciousness, becomes instead a fleshed-out subject.⁵³

“Kew Gardens” can be read as a sequel to “The Mark on the Wall” not only because of the snail image, but also because both stories center around questions of perspectives, the former through a single character’s protean consciousness and the latter through multiple consciousnesses. “Kew Gardens” registers differences between animal and human perspectives, recognizing the snail’s simple experience as a richness of defamiliarizing sensations. The cast of characters includes several pairs of people walking by a flowerbed—a married couple, a pair of men (one of them elderly and apparently senile), a pair of elderly women, and a young couple—as well as the snail navigating the flowerbed. Though the narrator’s vantage point at the flowerbed remains constant, the human characters move in and out of focus, their thoughts, conversations, and actions occupying a few paragraphs each.

⁵³ Woolf, *Diary*, vol. 2, 14.

Perspective shifts in this story on the narrative as well as the thematic level—the voice shifts from a third-person objective narration, in which characters are described as they would appear to an outsider, to a third-person limited narration that registers a character’s thoughts, to interior monologue, to the free indirect discourse for which Woolf is so well-known. The first couple to pass the flower bed, Simon and Eleanor, are first described in objective terms: “The man was about six inches in front of the woman, strolling carelessly, while she bore on with greater purpose, only turning her head now and then to see that the children were not too far behind” (*CSF* 84). In the next sentence, the narration penetrates deeper into Simon’s thoughts: “The man kept this distance in front of the woman purposely, though perhaps unconsciously, for he wanted to go on with his thoughts” (*CSF* 84). This move toward interiority paves the way for Simon’s interior monologue, encased in quotation marks, in which he remembers a walk through the gardens fifteen years earlier. By the end of the story, with the final pair to pass by the flower bed, Woolf is introducing some of characters’ thoughts through free indirect discourse: “[H]e felt that something loomed up behind her words, and stood vast and solid behind them; and the mist very slowly rose and uncovered—O Heavens,—what were those shapes?—little white tables...” (*CSF* 88). This mutability of the narrative voice reflects the story’s thematic focus on the multiplicity of perspectives, on the vastly different appearances and meanings that a flowerbed can have for different subjects encountering it.

The snail is the only character in the story to recur at multiple moments, for it remains in the flowerbed while the human characters pass out of sight. Like the flowerbed, then, the snail serves as a focal point. We are first introduced to the snail through a passing remark in the first paragraph: “The light fell either upon the smooth grey back of a pebble, or the shell of a snail with its brown circular veins” (*CSF* 84). At this point, the narration remains objective and

external. In the snail's next appearance, however, this objectivity gives way to a more subjective form of narration, allowing us indirect access to the snail's perspective and interiority:

In the oval flower-bed the snail, whose shell had been stained red, blue and yellow for the space of two minutes or so, now appeared to be moving very slightly in its shell, and next began to labour over the crumbs of loose earth which broke away and rolled down as it passed over them. It appeared to have a definite goal in front of it, differing in this respect from the singular high stepping angular green insect who attempted to cross in front of it, and waited for a second with its antennae trembling as if in deliberation, and then stepped off as rapidly and strangely in the opposite direction. Brown cliffs with deep green lakes in the hollows, flat, blade-like trees that waved from root to tip, round boulders of grey stone, vast crumpled surfaces of a thin crackling texture—all these objects lay across the snail's progress between one stalk and another to his goal. Before he had decided whether to circumvent the arched tent of a dead leaf or to breast it there came past the bed the feet of other human beings. (*CSF* 85-6)

At the beginning of this passage, the narrator and reader occupy some position outside the snail, a vantage point from which "he" "appears" to be moving and acting, his "deliberation" qualified by the provisional phrase "as if."

The turning point in the passage begins with the phrase "[b]rown cliffs," at which the story's perspective shifts to a snail's-eye view of the garden. Woolf presents in this sentence an impressionistic micro-landscape that invites readers to see tiny pebbles and leaves and blades of grass in a new way. When we imagine ourselves as snail-sized, the minutiae of a flowerbed become objects of wonder and aesthetic appreciation. The narration, of course, remains third-person and maintains some human mediation of the snail's perspective. The metaphors of cliffs, deep lakes, trees, and boulders rely on a human scale—we can only understand what seems vast to the snail by comparing it to what seems vast to us. Woolf does not ask her readers to abandon their human frame of reference entirely, and indeed, it would be impossible to do so given that, in Lloyd Morgan's words, "we cannot think of [animal minds] in any other terms than those of human consciousness" (*ALI* 335). But she does fashion for us an encounter with a strange and

defamiliarizing perspective, showing us seemingly insignificant details of the world through a new lens.

Woolf's snail is more than just a new lens for aesthetic contemplation, however. He is also a subject that registers his sensory perceptions in conscious thought, as becomes clear the next time the narration returns to him:

The snail had now considered every possible method of reaching his goal without going round the dead leaf or climbing over it. Let alone the effort needed for climbing a leaf, he was doubtful whether the thin texture which vibrated with such an alarming crackle when touched even by the tips of his horns would bear his weight; and this determined him finally to creep beneath it, for there was a point where the leaf curved high enough from the ground to admit him. He had just inserted his head in the opening and was taking stock of the high brown roof and was getting used to the cool brown light when two other people came past outside on the turf. (*CSF* 87-8)

As in the accounts of Thorndike and the animal psychologists, in this passage the snail's thoughts are tied directly to the sensory world—the crackle and thinness of the dead leaf, the coolness and light of its underside. The snail is no unconscious automaton, however; he is aware of these stimuli and of what they mean. He even exhibits logical reason when he “determines” to crawl under the leaf rather than over it. This moment of human-like ratiocination might make some behaviorist-minded readers skeptical, but I think it would have met with the approval of at least one scientist who studied animal psychology—Darwin. The snail's assessment of the leaf echoes Darwin's own claim, in his 1881 *Formation of Vegetable Mould Through the Action of Worms*, that earthworms assess the size and shape of leaves as they drag them into their underground tunnels. “We can hardly escape from the conclusion that worms show some degree of intelligence in their manner of plugging up their burrow,” he declares.⁵⁴ Woolf's thinking

⁵⁴ Charles Darwin, *The Formation of Vegetable Mould Through the Action of Worms*, 91. Eileen Crist has explored Darwin's representations of worm cognition and their implications for scientific studies of animals. See Eileen Crist, “The Inner Life of Earthworms: Darwin's Argument and Its Implications.”

snail, then, is not necessarily a creation of pure artistic license; it is also consonant with some of the earliest scientific representations of animal minds.

Woolf's snail, despite such arguably anthropomorphic moments, is primarily a sensuous creature with a nonhuman consciousness. His experience is dominated by sensations of colors, shapes, and sounds, and even when he acts purposefully and thinks logically, his thought remains free of the social, cultural, and ideological baggage of the human characters. The story's juxtaposition of human and animal perspectives makes this absence even clearer. While the human characters are haunted by their memories, "the spirits of the dead," or the insufficiency of conversation, the snail experiences no such discomfort. As a bare subject, the snail offers an alternative model to the human characters with their worries, social pressures, and troubling abstract thoughts.

It would not be fair, however, to say that when "Kew Gardens" compares human and nonhuman experience, it universally decides in favor of the latter. Some of the humans do experience strange and refreshing states of consciousness. For example, one of the elderly women, passing the flowers, sees them "as a sleeper waking from a heavy sleep sees a brass candlestick reflecting the light in an unfamiliar way" (*CSF* 87). This defamiliarizing vision allows her to transcend the inanity of human conversation: "[she] ceased even to pretend to listen to what the other woman was saying. She stood there letting the words fall over her, swaying the top part of her body slowly backwards and forwards, looking at the flowers" (*CSF* 87). This passive, non-linguistic, yet meaningful moment approximates the nonhuman experience that Woolf and others associated with animals, showing that people can sometimes feel this way too. Similarly, human readers, by projecting themselves into the minds of nonhuman subjects, can access this kind of animal experience.

In 1933, more than a decade after Woolf began to explore animal perspectives in “The Mark on the Wall” and “Kew Gardens,” she revisited the subject at greater length. Her novel *Flush* presents a “biography” of Elizabeth Barrett Browning’s dog, indirectly narrating the poet’s courtship with and marriage to Robert Browning. Like Woolf’s earlier work, the novel illustrates animal consciousness through a focus on sensation and perception. But in this novel, the line between human and nonhuman subjectivity is not so easy to draw. Unlike the snail of “Kew Gardens” or the barnacle of “Possible Worlds,” *Flush* is a domesticated creature; and according to Woolf, this means that he is not completely free from human culture and human ideology. *Flush* lives in a world of people, and this world impresses on him a certain amount of “human sympathy.”⁵⁵ He thus straddles the line between the receptive purity of nonhuman consciousness and the anxious thought of human consciousness.

Flush has been marginalized in Woolf studies, primarily because it is not highbrow literature in the way that novels like *The Waves* or *To the Lighthouse* are. Indeed, Woolf records in letters that writing *Flush* was a “freak... to let my brain cool” after the intense mental labor of writing *The Waves*, and that the biography of a dog was her way of playing a “joke” on Lytton Strachey, Bloomsbury’s resident biographer.⁵⁶ Woolf’s tone in the book often mocks the grandiosity of biography and Victorian writing, and the comic element in *Flush* is undeniable. The lighthearted tone, however, is no reason not to take *Flush* seriously. Indeed, the novel reflects Woolf’s signature interest in experimenting with perspective and reveals her engagement with philosophical and psychological ideas about subjectivity. Woolf’s parodic intentions should not obscure her sincere interest in the task of representing an animal mind.

⁵⁵ Woolf, *Flush*, 26; subsequent references cited in text as *F*.

⁵⁶ Woolf, *Letters*, vol. 5, 161-162.

Recently, a few critics have given *Flush* new attention within the context of animal studies. Craig Smith claims that the book is “an attempt to exercise modernist literary techniques in the mapping of a canine subjectivity, as an experiment worth performing for its own sake.”⁵⁷ He reads the book through the lens of late twentieth-century ethology and animal psychology, but does not address how early twentieth-century biological and psychological ideas about animal minds influenced Woolf. Jutta Ittner associates *Flush* with “the traditional anthropomorphic view, where the animal is inextricably linked to human consciousness and deprived of its own agency,” a view she finds ethically problematic.⁵⁸ Dan Wylie suggests, alternatively, that anthropomorphic imagining such as we see in *Flush* “is necessarily an ethical act.”⁵⁹ Other notable animal studies approaches to *Flush* include essays by Jeanne Dubino and Derek Ryan, which explore ideas of human-canine coevolution and multispecies entanglements in the novel.⁶⁰ I offer a different reading of *Flush* as a text that engages with contemporaneous ideas about animal psychology and the epistemological challenge of representing a dog’s mind. I take seriously Quentin Bell’s observation that “*Flush* is not so much a book by a dog lover as a book by someone who would love to be a dog,” and I believe that Woolf’s intervention in *Flush* is less a definitive statement about animal ethics than it is an exploration of what philosophy calls the problem of other minds.⁶¹

Flush, like the animals that Morgan and Haldane’s prose evokes, is primarily a creature of sensation and instinct. In the following passage, describing an episode in *Flush*’s puppyhood,

⁵⁷ Smith, “Across the Widest Gulf,” 349.

⁵⁸ Ittner, “Part Spaniel, Part Canine Puzzle,” 182-183.

⁵⁹ Wylie, “The Anthropomorphic Ethic,” 128.

⁶⁰ See Jeanne Dubino, “The Bispecies Environment, Coevolution, and *Flush*” and Derek Ryan, “From Spaniel Club to Animalous Society: Virginia Woolf’s *Flush*.”

⁶¹ Bell, *Virginia Woolf: A Biography*, 410. Wylie also claims that the “problem of other minds” is central to *Flush*, but sees this problem as a primarily ethical one, whereas I think it a primarily epistemological one (at least as it plays out in this novel), albeit with consequences for ethics.

primary sensations activate instincts, which Woolf portrays as a set of imaginary perceptions, or perceptions of things that are not there:

The cool globes of dew or rain broke in showers of iridescent spray about his nose; the earth, here hard, here soft, here hot, here cold, stung, teased and tickled the soft pads of his feet. Then what a variety of smells interwoven in subtlest combination thrilled his nostrils; strong smells of earth, sweet smells of flower; nameless smells of leaf and bramble; sour smells as they crossed the road; pungent smells as they entered bean-fields. But suddenly down the wind came tearing a smell sharper, stronger, more lacerating than any—a smell that ripped across his brain stirring a thousand instincts, releasing a million memories—the smell of hare, the smell of fox. Off he flashed like a fish drawn in a rush through water further and further. He forgot his mistress; he forgot all human kind. He heard dark men cry ‘Span! Span!’ He heard whips crack. He raced; he rushed. At last he stopped bewildered; the incantation faded. (*F* 6)

The passage begins by describing the many appeals that the field makes to Flush’s senses: the look and feel of dewdrops, the texture and temperature of the earth, and the various smells that Flush’s keen nose can detect. The smell of game triggers Flush’s instinct to hunt, an instinct that Woolf encodes as a kind of race-memory. She imagines that Flush has inherited the sense-experience of his ancestors, the sound of men calling “Span!” and cracking whips. Most biologists, by the 1930s, gave little credence to this Lamarckian notion that experience was heritable. But although Woolf’s conception of instinct does not resonate with twentieth-century biology, her conception of animal experience in general—as a set of sensations from both within and outside the animal—aligns rather closely with the ideas of animal psychology.

One of the techniques that Woolf uses to represent Flush’s experience is delayed decoding. A term invented by Ian Watt to describe one of Joseph Conrad’s impressionist techniques, delayed decoding is a device in which an author or narrator relates the sense-impressions of an event before, or without, explaining the event’s meaning.⁶² In the following

⁶² Watt, *Conrad in the Nineteenth Century*, 175-6.

passage, the narrator of *Flush* relates her protagonist's sense-impressions, but leaves it to her readers to decode the meaning of these impressions:

[Flush] entered mysterious arcades filmed with clouds and webs of tinted gauze. A million airs from China, from Arabia, wafted their frail incense into the remotest fibres of his senses. Swiftly over the counters flashed yards of gleaming silk; more darkly, more slowly rolled the ponderous bombazine. Scissors snipped, coins sparkled. Paper was folded; strings tied. What with nodding plumes, waving streamers, tossing horses, yellow liveries, passing faces, leaping, dancing up, down, Flush, satiated with the multiplicity of his sensations, slept, drowsed, dreamt and knew no more until he was lifted out of the carriage and the door of Wimpole Street shut on him again. (*F* 15-17)

From the imagery of this passage—the smell of incense, the sound of scissors, the gleam of money—we can infer that Elizabeth Barrett has taken Flush shopping. But this use of delayed decoding prioritizes not the event itself, but Flush's experience of it—an experience very different from the human experience of going shopping. Flush does not know or care about the chores and costs associated with entering shops; instead, he surrenders himself to the pleasurable sights, sounds, and smells with disregard for their human meanings.

Indeed, Flush's sensations lead him to create a peculiarly inhuman worldview. Like Haldane's philosophical barnacle, Flush has a dog-philosophy all his own: “[I]t was in the world of smell that Flush mostly lived. Love was chiefly smell; form and colour were smell; music and architecture, law, politics and science were smell. To him religion itself was smell” (*F* 67). Apparently an empiricist dog, Flush traces abstract ideas of religion, science, and so on back to their primary instantiations as particular perceptions. It is hard to believe that Woolf did not have in mind here Haldane's description of the intellectual dog in “Possible Worlds.” Haldane writes that dogs have strong emotional responses to smells, and that “[i]f dogs had a religion they would certainly flood their holy buildings with that ‘doggy’ smell which is the material basis of their herd instincts” (*PW* 267). He suspects that this reliance on smells and the emotional responses to smells would make dogs of a more religious than scientific temperament, but

declares that if dogs did develop a science, they would “classify things according to their smells” rather than their sizes or appearances (*PW* 267). When Woolf writes that science, religion, law, and many other categories of understanding, for Flush, *are* smell, she approaches the same conclusions that Haldane does, with similar implications. If Flush’s religion emerges from sensory perceptions, so must human religion, rather than being handed down from on high. And religious experience, then, is significant *as* experience, rather than as unveiling of truth.

Flush’s olfactory philosophy, science, and religion may remind us of another modernist dog-philosopher—the narrator of Kafka’s “Investigations of a Dog.” This story revolves around a scientifically-minded dog who conducts “researches” into important matters of dog metaphysics, including the all-consuming question of where food comes from. “Investigations” could not have influenced *Flush* or vice versa—Kafka’s story was written in 1922 but not published until 1931 and not translated into English until 1946. Nevertheless, the stories’ commonalities suggest that the trope of the philosophical animal was widespread in the 1920s and closely bound to literary experimentation. The juxtaposition also illuminates what is unique about *Flush*. Its representations of animal consciousness are less enigmatically allegorical—which is to say less Kafkaesque—than those of “Investigations of a Dog.” They are closer to the “realistic animal stories” that Allan Burns has described as “literary extensions of natural history,” than to the fantastic and fabulistic world of Kafka’s animal tales.⁶³ *Flush*’s descriptions of animal consciousness are grounded in the mundane, embodied everyday life of dogs, and they are often consonant with, perhaps even informed by, comparative psychology.

Flush’s intellectual life is built on a foundation of perceptions strung together through associations—a paradigm that animal psychologists used to explain how animals learn. Morgan,

⁶³ Burns, “Extensions of Vision,” 350.

drawing on the associationist psychology of J.S. Mill and Alexander Bain, claims that association of ideas in animals “is the means—the sole means—by which experience is made available for the guidance of action” (*ICP* 90). In other words, it is through association of ideas—not through abstract logic or reason—that animals learn. Woolf’s account of Flush’s learning process echoes the associationist claims of the animal psychologist. When Elizabeth Barrett takes him for walks in Regent’s Park, he tries to run free but is hindered by his leash. However,

before many of these walks were over a new conception had entered his brain. Setting one thing beside another, he had arrived at a conclusion. Where there are flower-beds there are asphalt paths; where there are flower-beds and asphalt paths, there are men in shiny top-hats; where there are flower-beds and asphalt paths and men in shiny top-hats, dogs must be led on chains. (*F* 17-18)

Although Woolf uses the term “conclusion” to name Flush’s newfound knowledge, it is not a conclusion approached through a process of logical thinking but instead through “setting one thing beside another,” or associating things. Flush learns from his experience to associate flower-beds, asphalt paths, men in top-hats, and his own leash, so that after a few walks in the park he no longer expects to be allowed to run free. Like his “religion” and his “science,” Flush’s practical everyday knowledge rests on a foundation of sensory impressions which combine to form particular concepts in his mind.

We have seen that Flush’s life is ruled by sensation, whether instinctual urges or external perceptions; and this might lead us to conclude that all of Flush’s experiences resemble the passive pleasures that Thorndike described, the peaceful freedom from human anxieties and ideologies that Thorndike believed animals to possess. Although Woolf is herself invested in the idea that animals provide a model of consciousness serving as a welcome alternative to human

consciousness, she does not allow Flush complete liberation from cares, human or otherwise. She writes,

[T]hough it would be pleasant for the biographer to infer that Flush's life in late middle age was an orgy of pleasure transcending all description; to maintain that while the baby day by day picked up a new word and thus removed sensation a little further beyond reach, Flush was fated to remain for ever in a Paradise where essences exist in their utmost purity, and the naked soul of things presses on the naked nerve — it would not be true. Flush lived in no such Paradise. The spirit, ranging from star to star, the bird whose furthest flight over polar snows or tropical forests never brings it within sight of human houses and their curling wood-smoke, may, for anything we know, enjoy such immunity, such integrity of bliss. But Flush had lain upon human knees and heard men's voices. His flesh was veined with human passions; he knew all grades of jealousy, anger and despair. (*F* 68)

Here, Woolf offers one of the best articulations of the modernist version of animal consciousness, but it is one laced with irony, and one that “the biographer” comes to reject. Flush's life is *not* all pleasure and purity and sensations unmediated by ideology—“the naked soul of things press[ing] on the naked nerve”—but instead has its fair share of troubles too. Yet even here, where Woolf seems to call into question the idealized version of the primitive animal mind, she indirectly reinforces it. For it is human contact that distinguishes Flush from the remote, blissful bird; it is humans who have taught Flush to feel jealous, angry, or despairing. Flush's mind does not always resemble the ideal animal mind because it is hybrid, its contours changed by human companionship.

We see the impact of human companionship on Flush most clearly when we compare his interactions with other dogs to his relationship with Barrett Browning. Allowed to run free in Florence, Flush mates indiscriminately with the other dogs he comes across, satisfying the urge whenever it strikes him with no signs of inhibition. Woolf writes,

Flush knew what men can never know—love pure, love simple, love entire; love that brings no train of care in its wake; that has no shame; no remorse; that is here, that is gone, as the bee on the flower is here and gone. . . . So variously, so carelessly Flush embraced the spotted spaniel down the alley, and the brindled dog and the yellow dog—it

did not matter which. To Flush it was all the same. He followed the horn wherever the horn blew and the wind wafted it. (*F* 60-61)

Flush's sexual interactions with other dogs are entirely free of possessiveness, jealousy, or anxiety; instead they show pure abandonment to desire and instinct. (Here Woolf seems to echo, with a shade of irony, the primitivism of figures like D.H. Lawrence or Paul Gauguin, who idealized such sexual freedom.) In contrast, Flush's relationship with Barrett Browning is marked by fidelity and jealousy—he initially resents and distrusts Robert Browning, even going so far as to attack him, because he sees that Browning has usurped Flush's place in his mistress's heart. In the world of dogs, Flush is a carefree little primitive; in the world of humans, he absorbs human cares.

At the encouragement of Barrett Browning, Flush even approaches human-like self-consciousness, yet falls short of attaining it:

Miss Barrett... did her best to refine and educate his powers still further... [S]he would make him stand with her in front of the looking-glass and ask him why he barked and trembled. Was not the little brown dog opposite himself? But what is 'oneself'? Is it the thing people see? Or is it the thing one is? So Flush pondered that question too, and, unable to solve the problem of reality, pressed closer to Miss Barrett and kissed her 'expressively.' *That* was real at any rate. (*F* 26)

Here Flush approaches the "mirror stage," confronting the problem of resolving objective appearance and subjective experience into a single notion of self; yet he cannot ultimately achieve this resolution. Philosophers and psychologists from Kant to Lacan have suggested that self-consciousness distinguishes human subjects from other beings; and for Woolf, Flush's inability to reconcile the dog in the mirror with his own subjective experience points to a divide between the nonhuman and the human.

The divide between Flush, in his nonhuman subjectivity, and the human world reasserts itself throughout the novel and ultimately becomes just as significant than Flush's human

sympathies. Even though Barrett Browning and Flush share a close bond, they occasionally reach limits in their empathic understanding of each other, seeing instead only the strangeness of species difference when they look at one another:

[S]ometimes the tie would almost break; there were vast gaps in their understanding. Sometimes they would lie and stare at each other in blank bewilderment. Why, Miss Barrett wondered, did Flush tremble suddenly, and whimper and start and listen? She could hear nothing; she could see nothing; there was nobody in the room with them. She could not guess that Folly, her sister's little King Charles, had passed the door; or that Catiline the Cuba bloodhound had been given a mutton-bone by a footman in the basement. But Flush knew; he heard; he was ravaged by the alternate rages of lust and greed.... Flush was equally at a loss to account for Miss Barrett's emotions. There she would lie hour after hour passing her hand over a white page with a black stick; and her eyes would suddenly fill with tears; but why? (*F* 21)

Barrett Browning, with human senses less keen than Flush's, cannot always recognize what triggers his behavior; and Flush, for his part, cannot divine the meaning of human writing, or the link between language and emotion that is so strong for the poet. Flush may be more acutely sensitive to human thoughts and feelings than the average dog, but even he cannot cross species boundaries.

And so *Flush*, a book that seems to be about the strong bond of companionship between a woman and her dog, is equally a book about species difference, about the mutual strangeness of nonhuman and human. Adopting the voice of the "biographer," Woolf is in a position to represent the normally-inaccessible consciousness of the dog, to offer insight into those aspects of Flush's subjective life that even his closest companions could not understand. Yet as a human being, Woolf's biographer-narrator confronts the limitations of human senses and human language in understanding and describing the full extent of Flush's experience. "Not even Mr. Swinburne could have said what the smell of Wimpole Street meant to Flush on a hot afternoon in June," Woolf writes; even the most sensuous of poets cannot find words for the sensations a dog feels (*F* 67). The empathic imagination of the writer can, to a large degree, connect species,

but at some point Woolf reaches the same conclusion that Morgan and Haldane do, the same kernel of obscurity at the heart of nonhuman experience.

Conclusion: Open Subjects

What should we make of this modernist valuation of animal subjectivity as a welcome alternative to human subjectivity? We could read it as a retreat from intellectualism, a naïve belief that we, like other animals, can somehow escape ideology, or merely another version of modernist primitivism engaging in familiar essentializing moves. I think that all of these factors are at play, but we can also read into the modernist attraction to the animal mind a different, and potentially progressive, ethic at work. The animal subject, in modernist accounts, is passive rather than active, receptive rather than aggressive, and most importantly, is profoundly open to the world around it. For an intelligentsia anxious about the specter of solipsism, and the danger of getting stuck inside one's own head, the radical openness of the animal mind could actually serve as a welcome model for how to be in and engage with the world.

The subject of liberal humanism is distinguished by its individuality, relative autonomy, and boundedness. In N. Katherine Hayles's formulation, liberal humanism is characterized by faith in "a coherent, rational self, the right of that self to autonomy and freedom, and a sense of agency linked with a belief in enlightened self-interest."⁶⁴ Animals function as the reverse of this humanist self—most people, modernist writers included, believe that animals are not rational, autonomous, or agentic. Animal psychologists and the modernists I discuss in this chapter do not radically challenge the animal side of this binary—on the contrary, they affirm and refine it. Animals, in their accounts, are receptive, perceptive, and passive, but not independent,

⁶⁴ Hayles, *How We Became Posthuman*, 85-6.

intellectual, or active. Through their embodied senses, they are open rather than closed systems, in large part defined by environmental stimuli.

It is the human side of the binary that Woolf, Haldane, Russell, and the animal psychologists challenge. They reject the idea that the qualities which define the humanist subject are superior to those which define the animal; instead, they suggest that humans might learn something about themselves and their own ways of being in the world from thinking about animal experience. Instead of conceiving the self as a discrete individual, and the external world—objects as well as living things—as what is excluded from the self, these modernists use the animal subject to reimagine the self as permeable to the environment and to others. Instead of relying on the self-other binary that is associated with Enlightenment humanism, they posit fluidity and continuity between subject and world, psychology and physics. And instead of elevating the rational, knowing actor above the passive object world, they cut the subject back down to size. The new epistemology that these modernists propose—a system of knowledge that accepts and embraces subjective points of view, demands plurality of perspective, and acknowledges its own limitations—contributes to this redefinition of subjectivity by transforming the knowing, reasoning subject into something more partial, in both senses of the word.

This project of inventing the bare subject and reinventing the animal mind is a joint effort by scientists and humanists. It thus complicates any simplistic notion of the relationship between modernist literature and science. What is true of animal psychology is not necessarily true of all branches of science—while this particular discipline resisted instrumental reason and scientific hubris, not all disciplines followed suit. Nevertheless, this nexus between literary, philosophical, and scientific interests in animal experience represents an important moment for the histories of

modernism and animal studies, a moment of biocentric sentiment and cross-disciplinary exchange. Just as the animal subjects—including humans—I discuss in this chapter are perceived as open to their environments, the disciplines of animal psychology, philosophy, and literature were open, in this period, to their common cultural environment. This openness enabled them to collaboratively reshape notions of subjectivity and of the kinship between humans and nonhuman animals.

Woolf, Haldane, Russell, and the animal psychologists are all compelled by the kernel of opacity at the heart of other species' experience, the thing that is closed off to human knowledge, the unbridgeable gaps of species difference. They are equally compelled, however, by what we do know, or think we know, about the subjective lives of animals—their receptivity to the signals of the external world and the purity of their sensations. Modernists recognized the problems of epistemology and patterns of violence bound up with the humanist subject, and many of them turned away from it. They turned instead to the animal subject, which taught them how not to *act* upon, but sometimes merely to *be* in the world.

CODA

THE ZOOLOGICAL OUTLOOK IN THE TWENTY-FIRST CENTURY

Zoological modernism is about multidisciplinary exchanges of ideas about animals. It is D.H. Lawrence, Julian Huxley, and Aldous Huxley at work on a winter morning in 1928 with the sounds of the previous night's argument about scientific epistemology still ringing in their ears. It is Virginia Woolf bent over a volume of *The Science of Life*, or encountering animal psychology through a copy of Bertrand Russell's *Analysis of Mind*. It is Julian Huxley traveling through Africa as a spokesperson for imperial biology, stopping in a colonial outpost to project a *Secrets of Nature* film, perhaps marveling at Percy Smith's eerily beautiful cinematography. And it is any of these figures contemplating a moth, a bird, or a dog and filtering their observations into their work. At the nexus of professional zoology, popular science, literature, film, philosophy, and particular interspecies encounters, modernist ideas about animals took shape.

From the standpoint of animal studies, these early twentieth-century conversations between zoology and the arts often look ethically promising. Western philosophy had long portrayed animals as degraded beings, deprived of language (or occasionally as exalted beings, free of language); Western religions had seen animals as soulless or sacrificial objects; capitalism had used animals as commodities. Even Victorian natural history often considered animals as mere type specimens in the taxonomic project, and some of Darwin's followers were more interested in animals as symbols of man's prehistoric past or unconscious drives than as living creatures in the modern world. But zoological modernists offered an alternative to these ideas. They perceived and represented animals as a diverse group of beings with complex

interrelationships and rich inner lives. They showed how even small, conventionally ugly, or seemingly insignificant creatures such as bats, aphids, and snails could be fascinating and often beautiful.

Yet it would be a mistake to assume that for writers and humanists, listening to zoologists always had a positive ethical payoff. For the early twentieth century was also the heyday of eugenics. Biologists, looking at artificial selection in agriculture's animals, decided that the human stock needed similarly to be "improved," and many writers, artists, and philosophers took the idea and ran with it. Scientific ecology, meanwhile, took a managerial view of environments with little concern for the well-being of animals, or, for that matter, indigenous people, and the Wellsian literature inspired by scientific ecology displayed a similar managerial impulse toward both animal and human "pests." Although ecology's rejection of the divide between "nature" and the human would appeal to many twenty-first-century thinkers, animal studies scholars would hardly find its treatment of animals ethically promising. Animal advocates today would also be troubled by twentieth-century laboratory biology, which frequently treated animals as instrumental objects, subjected to inhospitable living conditions and cruel experiments. They would be haunted, as I am, by the images of laboratory animals in Aldous Huxley's *Antic Hay*:

In the annex of the laboratory the animals devoted to the service of physiology were woken by the sudden opening of the door, the sudden irruption of light. The albino guinea-pigs peered through the meshes of their hutch and their red eyes were like the rear lights of bicycles. The pregnant she-rabbits lolloped out and shook their ears and pointed their tremulous noses towards the door. The cock into which Shearwater had engrafted an ovary came out, not knowing whether to crow or cluck... The rats who were being fed on milk from a London dairy came tumbling from their nest with an anxious hungry squeaking. They were getting thinner and thinner every day; in a few days they would be dead. But the old rat, whose diet was Grade A milk from the country, hardly took the trouble to move. He was fat and sleek as a brown furry fruit, ripe to bursting. No skim and chalky water, no dried dung and tubercle bacilli for him. He was in clover. Next week, however, the fates were plotting to give him diabetes artificially.¹

¹ Huxley, *Antic Hay*, 348.

Huxley describes animals as creatures with eyes, ears, noses, voices, and perspectives, yet subject to confinement, starvation, and disease for the purposes of science. Twentieth-century biology helped to generate a new understanding of animals as creatures demanding intellectual and ethical consideration, but it also continued to treat animals—and people—in disturbing ways.

The question I wish to pose in this conclusion, then, is how zoological modernism might help humanists envision an ethical and productive relationship with zoology today.

Understanding animals—how they live, what they enjoy, what they need in order to thrive—from a scientific point of view is crucial to developing an animal ethics. Cary Wolfe recognizes this debt to biology, writing,

Animal studies, as a branch of cultural studies... would probably not exist, at least not in its current form, without the work done in field ecology and cognitive ethology over the past twenty to thirty years—work brought vividly before the popular imagination by films such as the story of Dian Fossey, *Gorillas in the Mist*, and Jane Goodall's documentary *The People of the Forest: The Chimps of Gombe* and by television documentaries such as *The Animal Mind*, in the PBS series *Nature*.²

The practices of zoology have produced new knowledge about animals that animal studies scholars must take into account. But if field ecology and cognitive ethology helped to galvanize animal studies in the humanities, other fields such as veterinary and agricultural sciences have not been so congenial. Bernard Rollin has shown how, as recently as the 1980s, veterinary and agricultural scientists denied that animals could feel pain, and research on animal pain relief was nonexistent.³ Such evidence suggests that humanists invested in animal studies must avoid a naïve scientism that takes whatever biologists say at face value. How do we work with biology without letting it determine or foreclose our ethical commitments?

² Wolfe, "Human, All Too Human: 'Animal Studies' and the Humanities," 565.

³ Rollin, "Animal Mind: Science, Philosophy, and Ethics," 269-273.

First, I think that humanists working in animal studies should acknowledge that science is a legitimate and important, if provisional, way of knowing the world. Zoologists work with animals every day, producing new knowledge not only about their physiology and biochemistry but also about their behaviors, ecological roles, and mental lives. Humanists reared on Horkheimer and Adorno, or on D.H. Lawrence for that matter, sometimes resist science because they see it as an instrumentalizing and totalizing force that, like capitalism, quantifies everything and turns a blind eye to areas, such as aesthetics or play, that are not calculable. I have argued against this assumption throughout this dissertation—science in practice has many flaws, but it is not the enemy of play, affect, or the arts in general. Nor is it divorced from ethical considerations. Consider Donna Haraway’s call to stop performing certain kinds of animal research: “Improved comparative biobehavioral sciences, in and out of labs, as well as affective political and ethical reflection and action, tell us that no conditions are good enough to continue permitting many kinds of experiments and practices of captivity for many animals, not only apes. Note, I think we now know this, at least in serious part, *because* of research.”⁴ When it comes to studying animals and debating questions about how human actions affect them, humanists alone cannot provide all the answers. We need zoologists, with their specialized knowledge, to weigh in.

Second, we should bear in mind the lessons of science studies, which teaches us that science is always culturally situated. As J.B.S. Haldane knew, there is no objective standpoint from which we might criticize science, but there *are* many different points of view available to us—“Our only hope of understanding the universe is to look at it from as many different points

⁴ Haraway, *When Species Meet*, 89.

of view as possible.”⁵ Our training as literary critics gives us a particularly good vantage point from which we can analyze science’s language and ideological work. Looking back at the figurative language of Charles Elton, Julian Huxley, and the *Secrets of Nature*, this dissertation sheds light on their ideological frameworks and unspoken assumptions, and literary critics can do the same with science writing today. These approaches are not anti-science; indeed, by turning an analytical eye on scientific writing, they are true to the skeptical spirit of science, its “habit of doubting all theories, even those on which one’s action is founded,” to quote Haldane again.⁶ The animal studies community cannot afford to ignore zoological research, but it must also use its own disciplinary training to understand how such research is culturally situated.

Ecocritics and animal studies scholars have begun to engage with biology in promising ways, but debates about what scholars in the humanities should do with biological research remain unsettled. Queer ecology is one such battleground. Proponents of queer ecology and queer animal studies, including Timothy Morton and Stacy Alaimo, turn to zoology to find surprising ideas about life and vibrant new metaphors. Alaimo’s 2010 essay “Eluding Capture: The Science, Culture, and Pleasure of ‘Queer’ Animals” analyzes museum exhibits, journal articles, and popular science books about same-sex sexual behaviors in animals, celebrating queer animals not because they prove that “nature” has given same-sex sex its stamp of approval, but because they engender astonishment and appreciation for the diversity and flexibility of animals and animal behaviors. Morton, meanwhile, in *The Ecological Thought*, virtuosically fires off a series of biological references, from symbiosis to DNA exchange to the “extended phenotype” (Richard Dawkins’ term describing how genes reach beyond the boundaries of our bodies to encompass external matter, as in a spider’s web or a beaver’s dam) to Lynn Margulis’s

⁵ Haldane, *Possible Worlds*, 285-6.

⁶ *Ibid.*, 224.

theory of endosymbiosis (the notion that the eukaryotic cells which make up the “higher” organisms evolved from communities of single-celled organisms), in an argument that all living things are “a *mesh*, a nontotalizable, open-ended concatenation of interrelations that blur and confound boundaries at practically any level.”⁷

Such conclusions seem promising, proof that biology is able to furnish us with ethically and politically attractive models and metaphors, not just restrictive ideas about what is “natural.” Yet they have come under fire from the ecocritic Greg Garrard, who argues that Morton and his ilk play fast and loose with biology, misrepresenting scientific theories and research. For example, Garrard is particularly critical of queer ecocritical arguments that celebrate intersex animals without taking seriously the real possibility that anthropogenic pollution is causing endocrine disruption in many of these intersex creatures.⁸ Garrard raises a crucial environmental point, but in his haste to defend the ecologists studying the effects of pollution on animals, he does not acknowledge the value of asking questions about how we talk about intersex animals or how our cultural assumptions about sexuality might influence scientific research on these issues. It matters that we get the science right when we use biology as evidence, that we do not merely engage the science in “partial, opportunistic, and conspicuously biased” ways, as Garrard accuses queer ecocritics of doing.⁹ But it also matters that we are able to study the rhetoric and cultural frameworks of science without being dismissed as that bugaboo of the anti-humanities crowd, the “postmodernist” who thinks that everything is text and there is no material world.

⁷ Morton, *The Ecological Thought*, 33-38; the quotation is from Morton’s “Queer Ecology” (275).

⁸ Garrard, “How Queer is Green?” 92.

⁹ *Ibid.*, 73.

I think it is also important to be clear about what exactly we, as humanists studying the “more-than-human world” (to borrow a phrase from David Abram), can learn from science.¹⁰ Zoology can teach us about the animals with which we share the world, and it can prompt us to have affective, aesthetic, and ethical responses to animals, but it cannot tell us anything about how human society ought to be. We can borrow models and metaphors from the biological sciences to make political points, but we must be clear that *we* are the ones selecting and deploying these models, rather than falling into an updated version of the appeal to nature. The zoology of queer animals, fascinating as it is, can only tell us about queer animals; it cannot provide us with a ready-made queer politics. Ecocritics sometimes seem to tacitly assume that the attractive biological models they have selected—symbiosis, gene transfer, the fuzziness of species boundaries—are transparent and complete facts, and that these facts point to a particular ethical or political program. But at its best, ecocriticism recognizes that, in Morton’s words, ecological and zoological science may be “very suggestive for aesthetic and political thinking,” but it is only suggestive, not definitive or determinant.¹¹

Zoological modernism offers several important insights for ecocritics and animal studies scholars. It shows us that there are a range of possible positions between scientism and anti-scientism, and that we need not classify our understanding of animals as either objective scientific fact or arbitrary cultural construction. Wells and Elton remind us that there is competition as well as cooperation, death as well as life in the ecological community, and that the “bio-optimism” which underlies much nature-philic rhetoric, then as now, is only half the story. Lawrence and Huxley show that there is no “the animal,” no essence of animality to

¹⁰ See David Abram’s *The Spell of the Sensuous: Perception and Language in a More-Than-Human World*.

¹¹ Morton, *The Ecological Thought*, 14.

celebrate, but instead a richness of variation and diversity in the animal world. The *Secrets of Nature* films reveal to us a world that is not fully dominated by human intentions or circumscribed by human codes, a world where there is still space for contingency and animal agency. Russell, Haldane, and Woolf teach us to embrace the partiality and provisionality of our knowledge rather than swear off knowing altogether, and they inspire us to keep wondering what it is like to be another animal. Zoological modernism recasts scientific vision, literary language, and our understanding of animal lives in ways that continue to be philosophically challenging and aesthetically rewarding for readers today.

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