

Material ecocriticism, genes, and the phobia/philia spectrum

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Abstract Some materials may have more agency than we might imagine or wish. This was the radical proposal of E.O. Wilson more than three decades ago in *Biophilia* (1984). Evolutionary biologists have long speculated about the genetic roots of both our affinity with and our acrimony to nature, and ecocritics have been quick to fix on biophilia as a tenet of environmental salvation. The obverse side has won less favor. But the cheerful picture of a world run by biophilic impulses is as fanciful and inaccurate as utopic visions of a world without anger or evil. Irrational fears of snakes and darkness, for starters, are evolution-based ecophobia at play. I will review in this article what sorts of attempts ecocritics have made to reconcile our material animality and genetic inheritance with the production of literature. Such work has been described by Judith Heerwagen and Gordon H. Orians as “both futile and ideologically dangerous,” and sometimes with good reason (which I will get into in detail in the article). One of the things that quickly becomes apparent is that without verifiable data, virtually every ecocritical reading or theory we do amounts to little more than what Richard Lewontin calls “an exercise in plausible story telling rather than a science of testable hypotheses.” One of the ways to avoid this without becoming a mouthpiece for the sciences is to recognize that behavioral traits, though often shared, are contextual and individual, meaning that any kind of empirical or systemic analysis must also be case-by-case and not reducible to the kind of templates that are, perhaps, more pleasing to literary critics. Maybe we can plop deconstruction or new historicism down on any old text, but material ecocriticism of the sort I am proposing here is a much more painstaking endeavor. With

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a keen eye trained on the dangers of “literary Darwinism” (and all that it both entails and promises), I will argue that studying the genetic roots of ecophobia offers to explain (consonant with evolutionary psychology) how adaptive behaviors to a material world in which we no longer live function. This work is crucial if we are to understand how we got into our current environmental crisis, why we seem unable to get out of it, and why biophilic theorizing alone hasn’t answered and never will answer these questions.

Keywords Ecophobia · Biophilia · Genetic materialism · Material ecocriticism · Cultural biology

Introduction

To suggest the possibility of genetic influence, genetic difference, of an evolutionary past bearing down in some degree on cognition, on men and women, on culture, was to some minds like entering a camp and volunteering to work with Dr. Mengele.¹

Thus spoke Michael Beard, the voice of evolutionary compulsions in Ian McEwan’s *Solar*, a novel that, as Adam Trexler, has so expertly explained, “relentlessly catalogues the material effects of [...] evolutionary urges, as [the main character] vomits, urinates, gets drunk, and is ‘draped’ in ‘human blubber.’”² *Solar* seriously questions the capacity of humanity to make the changes that are needed to stop climate change. It is a central point of the novel. Beard himself wonders about our impulses and their effects. On a business class flight circling over London, while the pilot is waiting for permission to land, Beard wondered “how... could we ever begin to restrain ourselves? We appeared, at this height, like a spreading lichen, a ravaging bloom of algae, a mold enveloping a soft fruit—we were such a wild success. Up there with the spores!”³ It is reasonable to wonder if discussions about halting or reversing climate change are even valid, given that it is in the nature of life to do exactly what we do, to move *semper sursum*, and given that without natural predators or obstacles, any species would do its level best to take over. What would the world look like if mosquitoes—or tomatoes? Ants? Super-viruses?—had no natural predators? How different would those—cenes be?⁴ That we are doing what all living organisms do, what we are hard-wired to do, is a point Darwin

¹ McEwan (2010, p. 166).

² Trexler (2015, p. 48).

³ Ibid, pp. 127–128. Trexler observes that Michael Beard’s relationships and behaviors “are overdetermined by an evolutionary drive to compete and dominate against members of the same species” (2015, p. 48). Everything about Beard reeks of his appetites and of his compulsively seeking to satisfy them.

⁴ I ask these questions in “Anthropocene, What Anthropocene?” (Estok 2017, p. 45). I want to be clear here that despite my comments about possible compulsions, I am arguing strongly in favor of continued work on figuring out how to halt and reverse the problems we have caused and continue to cause (as I hope will be clear in what follows below).

himself makes: “There is no exception to the rule that every organic being naturally increases at so high a rate that if not destroyed, the earth would soon be covered by the progeny of a single pair.”⁵

We need to be clear here: nature is not moderate. It is often characterized, Elizabeth Grosz explains, by “an invariable tendency to superabundance, excessiveness, the generation of large numbers of individuals, in the rates of reproduction and proliferation of individuals and species.”⁶ Not only superabundance, but diversity, again as Darwin himself theorized: “more living beings can be supported on the same area the more they diverge in structure, habits, and constitution, of which we see proof by looking to the inhabitants of any small spot or to naturalized production.”⁷ The genetic drive toward producing abundance and diversity is an inescapable material reality of life.

One of the key elements of Darwinian theory is that the size of a population is limited by what its given environment can sustain, but obviously we have subverted this mechanism and have extended the capacity of environments to sustain more of our populations. Humans are clearly not the only organisms to have done this, to have made their environments more habitable, their food more attainable, their future prospects more viable. Some birds build nests, some ants farm aphids, and many animals kill members of their own species in fights.

Nor are we the only species that is indifferent to the natural environment. We are not the only species that pollutes, and we are not the only species that radically refashions of the biosphere. Even so, we are the only species currently doing these things to such an extent that geologists and laypeople are increasingly opting to call our current age The Anthropocene—The Age of the Human. But what got us here? And what will get us out? At least part of the answer has to do with agency and what we think about it.

Agency is precious to humanity—so precious that the loss of it puts in peril not only our sense of exceptionalism but our very sense of human identity. One of the issues that material feminisms (and its offshoot, material ecocriticisms) has investigated and stressed is the notion that nonhuman things—biotic and nonbiotic—have agency. Some materials, in fact, may have much more agency than we might imagine or wish. This was the radical proposal of E.O. Wilson more than three decades ago in a book entitled *Biophilia*.

The term “biophilia” originates with the German-born psychoanalyst and social philosopher Erich Fromm, who uses it to describe a “passionate love of life and all that is alive.”⁸ In a wide-ranging discussion of what motivates human cruelty and aggression, Fromm argues that

Biophilic ethics have their own principle of good and evil. Good is all that serves life; evil is all that serves death. Good is reverence for life, all that

⁵ Darwin (1996, p. 54).

⁶ Grosz (2008, p. 30).

⁷ Darwin (1996, p. 105).

⁸ Fromm (1973, p. 365).

enhances life, growth, unfolding. Evil is all that stifles life, narrows it down, cuts it into pieces.⁹

Wilson further develops the term “biophilia” in 1984 and defines it as “the innate tendency to focus on life and lifelike processes,”¹⁰ “the urge to affiliate with other forms of life,”¹¹ “the connections that human beings subconsciously seek with the rest of life.”¹² Wilson hypothesized that there are genetic bases for biophilia. It is a reasonable hypothesis, and it is reasonable also to hypothesize that there must be genetic bases for ecophobia. Studies have shown, for instance, that fear of snakes and of darkness are evolution-based.¹³ At what point a rational fear becomes a phobia is not within the scope of this article to address. Suffice it to say that there *is* a point at which such a thing happens, and when it does, we are dealing with ecophobia. When I tell my two young children, therefore, that there is no rational basis for being afraid of the dark, or of bees, or of spiders, or of bugs, or of dogs, or of any of the other things of which young kids are normally afraid, I know that I’m not being entirely truthful with them. These fears are not ecophobia, but they can certainly lead into it. Novels, films, and other narratives that exploit these fears, that nurture and coddle them, and that magnify and pervert them to sell a story or a product or a politician: that’s ecophobia. Evolutionary biologists have long speculated about the genetic roots of both our affinity with and our acrimony to nature, and ecocritics have been quick to fix on biophilia as a tenet of environmental salvation.

In addition to being unproven (and perhaps unprovable), the biophilia hypothesis alone cannot account for the realities of the world, for the kinds of things that are going on in the world, the factory farms, the rainforest destruction, the biodiversity holocaust, and it cannot make (or, at least, has not yet made) productive connections with theories about exploitation, about people who gain while others (human and nonhuman) foot the bill, or about intersections among ecophobia, homophobia, speciesism, and sexism. The problem with the uses to which biophilic theories have been put is that they have failed to recognize that biophilia is a point on a spectrum. Ecophobia is another point on that spectrum. It is the obverse side of biophilia, and it has certainly won less favor. Ecophobia is not an easy or particularly happy topic, and it does not offer the kind of cheerful picture of a world run by biophilic impulses that is so pleasing to ecocritics, a picture that is as fanciful and inaccurate as utopic visions of a world without anger or evil.

While I’ve stated before that ecophobia is analogous to misogyny, homophobia, and racism, no analogy is perfect.¹⁴ To see ecophobia as part of the spectrum

⁹ Ibid, pp. 365–366.

¹⁰ Wilson (1984, p. 1).

¹¹ Ibid, p. 85.

¹² Wilson (1992, p. 350).

¹³ See Roach (2001), References.

¹⁴ It is difficult, for instance, to imagine how discrimination on the basis of gender, sexual, or racial difference could ever have been an evolutionary necessity for continued human survival, and I don’t believe that they are or ever were. Recognizing misogyny, homophobia, and racism when they happen, therefore, is nuanced in very different ways than is recognizing ecophobia. I remember when I was still a

condition in which we find biophilia isn't inherently problematical—at least until we start addressing E.O. Wilson's theories about the biological bases of biophilia. Indeed, while I am reluctant to ignore E.O. Wilson's insistence on the genetic character of biophilia (and, therefore, any position on that spectrum, including ecophobia), “no findings,” to quote Roger Ulrich, “have yet appeared that constitute convincing support for the proposition that positive responding to nature has a partly genetic basis,”¹⁵ and one of the things I'd like to explore here has to do with this focus on the genetic dimensions of this spectrum condition. Failing to do so results in epidermal readings, approaches that are hollow surface endeavors. We might call this “hollow ecology,” explorations of environmental crises that—whatever they claim—do not perform the analyses of intra-action that Karen Barad so masterfully accomplishes in her theories about agential realism.¹⁶ Hollow ecology, in the plainest of terms, avoids the internalities of bodies, living and other. As theoretical physics is important for the study of the material agency of objects (living and non-), so too is there a real need to analyze how evolutionary biology and evolutionary processes (genetic and cultural) effect the human body and its material agency, from the perspectives of material ecocriticism. Only through such analyses is it possible to appreciate the sheer depth of the issues associated with ecophobia.

To ignore the dimensions and depths of ecophobia would be unproductive.¹⁷ Ecophobia is such a big thing, such a pervasive phenomenon that some people simply can't endure *any* theorizing about it. British Shakespeare enthusiast Gabriel

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teenager being told that using the word “girl” to describe women is misogynistic. It was tough for my sexist adolescent mind to grasp, and having the analogy of “boy” to describe African-American men as a comparison of racism made it easier. With nature, things are a bit more difficult, not least of all because there have been many things that have threatened our survival and for which fear has not only been very rational but also very necessary for that survival. Antipathies toward nature and hostile representations of nature do not, in themselves, constitute ecophobia. Nor, for that matter, is controlling nature *ipso facto* ecophobic.

¹⁵ Ulrich (1993, p. 122).

¹⁶ See Barad (2007), References.

¹⁷ Karen Thornber (2012) scrupulously lists—in her encyclopedic 688 page *Ecoambiguity: Environmental Crises and East Asian Literatures*—numerous monographs that explain what she sees as a reverence for nature that stands in ambiguous contrast with less reverential views. But in the interests of advancing her own thesis on “ecoambiguity,” a term at best problematical, Thornber too readily dispenses with the notion of ecophobia. As I have argued elsewhere,

Of course, ambiguity is everywhere, but what would happen if we really did what Thornber is suggesting and walked away from the concept of ecophobia (or biophilia, for that matter) in favor of ecoambiguity? One way to come at this question is to work through an analogous model and to ask what would happen if we decided against theorizing about homophobia in favor of homoambiguity. Certainly a similar case for homoambiguity over homophobia could be made analogously to the case Thornber makes for ecoambiguity over ecophobia. But who would make such a case, and for what reason? What would be the politics of such a stance toward the notion of homophobia? What kind of denial would this be? And what position(s) would such a denial implicitly endorse? What would happen if, following the same analogous pattern, Thornber argued for gynoambiguity over misogyny? Again, what would be the politics of such a stance toward the notion of misogyny? What kind of denial would this be? And what position(s) would such a denial implicitly endorse? (Estok 2013, p. 134).

Egan, for example, finds the term “virtually useless.”¹⁸ American educator Kip Robisch (at one time a Purdue University professor) bafflingly believes that “We’ve ‘theorized ecophobia’ enough already to prove the ineffectuality of such a course.”¹⁹ But the fact that we kill 56 billion farmed animals each year²⁰ suggests something very different; we haven’t even begun to tackle the question of how our uses of nonhuman animals reflects a perfect contempt for nature. It is ecophobia that allows us to do this. Indifference toward nature that causes harm is as much ecophobia as indifference toward women that causes harm is sexism. It is ecophobia that allows us to cut down magnificent trees, as much as it is sexism that allows Trump supporters to let slide his crude comments about women. It is ecophobia that allows adults to do what children perhaps would never knowingly do: most children find it repugnant to cause animals to suffer, to see animals die, and so on. The ecophobia hypothesis postulates that it is precisely the biophilia about which Wilson theorizes that makes children hate the suffering of animals and that it is when all the sensitivity of humanity is washed out, like Aldo Leopold’s “rivers washing the future into the sea,”²¹ that we find ecophobia taking prominence. I have stated before and will state again that ecophobia is winning out over biophilia (or ecophilia, or whatever we want to call it when a bear in the Budapest Zoo saves a drowning crow)²²; otherwise, it would simply be impossible to account for the less encouraging kinds of things that are going on in the world.

The “daunting assertions”²³ Stephen Kellert notes as facing proponents of the biophilia hypothesis are the same ones we face on the other end of the spectrum. Among these assertions, Kellert observes, are that the condition is inherent (biologically based), part of human evolutionary heritage, and associated with survival advantages. And in terms of proving the proposition, as with the biophilia hypothesis, so too with the ecophobia hypothesis: “the richness and depth of the subject preclude the possibility of achieving any definitive ‘proof.’”²⁴ If biophilia is an adaptive strategy, then ecophobia itself must be seen as one, though perhaps as useful for our survival as other long obsolete adaptations: the appendix, the tailbone,

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While of course there is no single approach that will shed light on and answer all questions about how to deal with the contradictions the literature Thornber presents offers, surely the privileging of the human over the nonhuman is central to everything that is going on in such texts and in theorizing about such texts. If such is the case (as I firmly believe that it is), then ambiguity is an effect rather than a cause, a branch rather than a root, a result rather than a reason. And if this is the case (and, again, it is difficult to see how such is *not* the case), then how do we address the root issue here, the anthropocentrism that keeps the human in a sanctified place above and immune from everything nonhuman? (Ibid, pp. 134–135).

¹⁸ Egan (2015, p. 31).

¹⁹ Robisch (2009, p. 703).

²⁰ See AnimalEQUALITY, References.

²¹ Leopold (1949, p. 140).

²² An amateur video recording by Aleksander Medveš of a bear rescuing a crow at the Budapest Zoo in June 2014 was posted and went viral: the stills in Fig. 1 are from that video. See Medveš (2014), References.

²³ Kellert (1993, p. 21).

²⁴ Ibid.



Fig. 1 Bear saving crow at Budapest Zoo, June 2014. Biophilia is not confined to humans, as the bear in Budapest shows. Ecophobia, on the other hand, it would seem, is distinctly human. There are no examples to suggest otherwise. (See also https://www.youtube.com/watch?v=gJ_3BN0m7S8)

wisdom teeth, and so on. Indeed, on many things we are in agreement, not the least of which is that “the mitigation of [our] environmental crisis may necessitate nothing less than a fundamental shift in human consciousness.”²⁵

To take seriously the goals of environmentalism, of reducing and reversing anthropogenic climate change, of getting off of the trajectory of death on which we are currently riding, it is absolutely urgent to take seriously the ideas that ecophobia is an obsolete adaptive strategy for survival and that it can be measured and contextualized through serious comparative cultural analyses.²⁶ I will review in this article some of the attempts ecocritics have made to reconcile our material animality and genetic inheritance with matters of culture and literature.

In proceeding, we might keep in mind the idea that mixing biology and literature has been described by Judith Heerwagen and Gordon H. Orians as “both futile and ideologically dangerous,”²⁷ and sometimes with good reason (which I will get into in detail in the article). Perhaps it is also reasonable to suggest here that without verifiable data, virtually every ecocritical reading or theory we do amounts to little more than what Richard Lewontin calls “an exercise in plausible story telling rather than a science of testable hypotheses.”²⁸ One of the ways to avoid falling into this trap without becoming a mouthpiece for the sciences is to recognize that behavioral traits, though often shared, are contextual and individual, meaning that any kind of empirical or systemic analysis must also be case-by-case and not reducible to the kind of template that is so pleasing to literary critics. Maybe we can plop deconstruction or new historicism down on any old text, but material ecocriticism of the sort I am proposing here is a much more painstaking endeavor. With a keen eye trained on the dangers of “literary Darwinism” (and all that it both entails and promises), I will argue that studying the genetic roots of ecophobia offers to explain (consonant with evolutionary psychology) how adaptive behaviors to a material world in which we no longer live function. This work is crucial if we are to understand how we got into our current environmental crisis, why we seem unable to get out of it, and why biophilic theorizing alone hasn’t answered and never will answer these questions.

²⁵ Ibid, p. 26.

²⁶ See also Estok (2015, p. 32).

²⁷ Heerwagen and Orians (1993, p. 141).

²⁸ Lewontin (1979, p. 11).

Volunteering to work with Dr. Mengele

I am increasingly of the opinion, along with Joseph Carroll, that “no reputable psychologist or anthropologist can ignore the findings of biologically oriented study, and even sociologists and political scientists will have to accommodate themselves to the reality of what is empirically known about the biological basis of human behavior.”²⁹ The topic has lately been getting a lot of attention. In a recent book entitled *Ecocriticism and the Idea of Culture: Biology and the Bildungsroman*, Helen Feder talks about “the cogent reality of materiality, [...] an agential world apart from human culture,”³⁰ of how “the need for a more biologically, ecologically informed critique is, if anything, now more urgent” than ever.³¹ Feder notes that other people have made such a call for a more biologically informed critique, citing Glen Love’s remark that humanists “have for the most part ignored the life sciences, especially evolutionary biology and ecology.”³² “By turning to biology, cultural biology, and related branches of the life sciences,” Feder argues, “we find the broader and more nuanced notion of culture necessary for a materialist ecocritical perspective.”³³ Feder proposes an “ecocultural materialist” approach.³⁴ Published in 2014, the same year as the seminal Iovino/Oppermann collection entitled *Material Ecocriticism*, Feder’s book is an explicitly materialist ecocritical inquiry that references and builds on the work done in the field to that date. It would be difficult after 2014, therefore, to discuss “material ecocriticism” in a meaningful way without reference to the work of Feder and of Iovino and Oppermann. The strength and value of this work at least in part resides in the persistent attention it pays to questions about agency and to questions about agency beyond the human (or what David Abram has called the “more-than-human”).³⁵

Material ecocriticisms (like their parent “material feminisms”) demand attention to materials, of which genes are one. Yet, the revulsion toward such research has been powerful, a revulsion that Jonathan Gottschall references in his part of the introduction to *The Literary Animal: Evolution and the Nature of Narrative*:

I quickly learned that when I spoke of human behavior, psychology, and culture in evolutionary terms, their [other professors’ and graduate students’] minds churned through an instant and unconscious process of translation, and they heard “Hitler,” “Galton,” “Spencer,” “IQ differences,” “holocaust,” “racial phrenology,” “forced sterilization,” “genetic determinism,” “Darwinian fundamentalism,” and “disciplinary imperialism.”³⁶

²⁹ Carroll (2012, p. x).

³⁰ Feder (2014, p. 1).

³¹ Ibid.

³² Love (2003, p. 49), as cited by Feder (2014, p. 1, n.1).

³³ Feder (2014, p. 1).

³⁴ Ibid, p. 2.

³⁵ Abram (1996, p. 15).

³⁶ Gottschall and Wilson (2005, p. xx).

The work that has been done initiating such research has been understandably defensive and tentative:

It is not clear why Darwin—whose enduring impact on knowledge and politics is at least as strong as that of Hegel, Marx, or Freud—has been left out of feminist readings. It is perhaps time that feminist theorists begin to address with some rigor and depth the usefulness and value of his work in rendering our conceptions of social, cultural, political, and sexual life more complex, more open to questions of materiality and biological organization, more nuanced in terms of understanding both the internal and external constraints on behavior as well as the impetus to new and creative activities.³⁷

Largely missing from feminist readings, Darwin is also largely absent, with a few exceptions, in the developing field of material ecocriticism.

Wendy Wheeler's foundational research in biosemiotics offers an enormous amount of profoundly useful work that develops ways that we can talk about and understand this topic. Wheeler's brief definition of "biosemiotics" is that it is "the study of signs and significance in all living things."³⁸ Wheeler's comments at the end of her "Postscript on Biosemiotics" serve as a suitable definition of what biosemiotics actually is:

Living things are not machines; their readings of the signs which constitute their world are also always interpretations which are, ipso facto, recursively fed back into that world where further readings and interpretations go on producing newer layers or strata of understanding. It is in these constant semiotic processes that we can talk about the ways in which worlds are both made and real.³⁹

She suggests that "in understanding that semiosis and meaning-making belongs to all living things, perhaps the biosemiotic turn will prove itself part of a wider movement toward reuniting what has too long been held apart."⁴⁰ This could take us toward mending the rift, removing the revulsion toward, and finally dealing with the materiality of genes.

The revulsion toward integrating biological theories with matters of culture, the arts, and so on is indeed well known. Wendy Wheeler refers to this as "the puzzling story [...] of how many intelligent people in the humanities and social sciences came to ignore the theory of evolution, and to believe that everything we think we know is just an effect of spoken or written language."⁴¹ Not so puzzling, though. Darwinism obviously, as the Gottschall quote above reflects, has been put to some uses (if I may be allowed to engage in some understatement) from which many of us would wish to distance ourselves. In her daring discussion of Darwin and feminism, Elizabeth Grosz acknowledges that "the suspicion with which biological accounts

³⁷ Grosz (2008, p. 24).

³⁸ Wheeler (2006, p. 19). For an extensive history of biosemiotics, see Favareau (2010), References.

³⁹ Wheeler (2008, p. 154).

⁴⁰ Wheeler (2011, p. 280).

⁴¹ Wheeler (2006, p. 24).

of human and social life are treated by feminists, especially feminists not trained in the biological sciences, is to some extent understandable.”⁴² At least part of what is at stake here is the very question of our own agency. “If we *are* our biologies,” Grosz continues, “then we need a complex and subtle account of that biology if it is to be able to more adequately explain the rich variability of social, cultural, and political life.”⁴³

Not all work in this area achieves the complexity and subtlety of which Grosz speaks. Joseph Carroll, for instance, argues that “if one affirms that science gives access to the real structure of the natural world, including human behavior and the products of the human mind, [then] one must necessarily reject most of the foundational theories currently accepted in the academic literary establishment.”⁴⁴ Yet, this position assumes that such theories rest on “an overarching belief that culture alone shapes human minds and motivates human behavior.”⁴⁵ Ecocritical theories in general and material ecocriticism more specifically clearly do not fit into the overarching belief structure Carroll describes. Iovino and Oppermann explain in the Introduction to *Material Ecocriticism* that “the new materialism suggests that things (or matter) draw their agentic power from their relation to discourses that in turn structure human relations to materiality.”⁴⁶ While Carroll imagines a single-source, unidirectional causal agent as the engine of “theories currently accepted in the academic literary establishment,” the new material turn and material ecocriticisms imagine something different, a mesh of inter-, and intractions in which there are many material sources of agency, including biological materialities. What Iovino and Oppermann describe as a “porosity of biosphere and semiosphere”⁴⁷ is clearly an acknowledgment of the entanglements of cultural, biological, and nonbiological agents.

As the new field of material ecocriticism develops, it is increasingly clear that part of the topic will involve questions about what could, for lack of a better phrase, be termed “genetic materialism” and that doing material ecocriticism will acknowledge and theorize about the materiality and agency of genes: indeed, not doing so would be like doing oceanography without acknowledging and theorizing

⁴² Grosz (2008, p. 23).

⁴³ Ibid, p. 24. In her discussion of biosemiotics, Wendy Wheeler similarly notes anxieties about agency as the central point of concern regarding the study of biology as it relates with culture:

Some readers may feel anxious about, or openly hostile to, the idea that biology can tell us anything about culture. Such apparent ‘biological determinism’, they will rightly feel, simply reduces human culture to biology, and leaves no room for the considerable effects of culture on human behaviour. But this view depends, precisely, upon the idea that nature and culture are quite different things, and that a linear description of biological evolution as simple cause and effect (rather than complex cause and effect producing stratification and emergence) is a satisfactory one. This is understandable, given that until quite recently the best known attempts to take the sciences, especially biology, and in particular human biology, into the field of human motivations and behaviour have remained caught within the limitations of the reductive paradigm. (2006, p. 22).

⁴⁴ Carroll (2015, p. 21).

⁴⁵ Ibid.

⁴⁶ Iovino and Oppermann (2014, p. 4).

⁴⁷ Ibid, p. 5.

about water. By the same token, however, material ecocriticism, like Marxist materialism, rightly rejects the core of genetic materialism and its insistence that materiality of our genes is the sole source of everything we do and produce. Paul D'Amato describes this idea of genes as the motive force of culture in the following way:

This line of reasoning, which goes back to such social Darwinists of the late nineteenth century as Sir Francis Galton and Herbert Spencer, presents us with the argument that human nature is the fixed and unchanging result of our biological makeup. Why do people behave the way they do? It's part of our genetic coding. Greed, selfishness, xenophobia, racism, male domination, violence, and war are all attributed to something innate to all of us. Needless to say, this is a very convenient argument for someone who is trying to uphold the status quo, for it places the blame for all sorts of nasty behavior on human traits that are beyond anyone's power to change.⁴⁸

D'Amato's nuanced description of genetic materialism captures the real issue here: there is much more to the story than genes. Despite E.O. Wilson's persuasive arguments for the genetic bases of biophilia, we have, by the end of the day, no more than a hypothesis about biophilia: "These fashionable ideas, though continually offered as fact, have no scientific foundation. Search as they may, biologists will never find a war gene—because war isn't innate to humans any more than is nonviolence. It's not that there is no biological basis for our behavior."⁴⁹ There is a biological basis for our behavior, of course, but it is mediated by a great many other factors.

Fools rush in

Wendy Wheeler has spoken of "the need for a return to biology—to break the great nervous silence in progressive thought on culture,"⁵⁰ of the "need for a materialist, but non-positivistic and non-reductionist, account of evolutionary cultural change."⁵¹ Indeed, but the terrain is riddled with landmines, and... well, fools rush in. It is one thing to say, for instance, as Gregory Cochran and Henry Harpending do, that a thing such as intelligence is heritable, but it is quite another to show an intelligence gene, to try to prove in scientifically valid ways why one group does better on tests designed to measure intelligence, and why biology should take precedence over culture. It was with considerable trepidation that I read their *The 10,000 Year Explosion*, especially the chapter entitled "Medieval Evolution: How the Ashkenazi Jews Got Their Smarts."⁵² As the son of two Ashkenazi Jews, and from a family fractured by the Holocaust, I read with an acute alertness to possible anti-Semitism, and although the chapter is not anti-Semitic by any stretch, it

⁴⁸ D'Amato (2014, pp. 24–25).

⁴⁹ Ibid, p. 25.

⁵⁰ Wheeler (2006, p. 14).

⁵¹ Ibid, p. 15.

⁵² Cochran and Harpending (2009, pp. 187–224).

engages (or so it seems to me) in groundless musings that are no less racist and arbitrary than nazi eugenics. There is little science here, but a lot of really dubious conjecture. The argument they make is that Ashkenazi Jews

[...] have an unusual set of serious genetic diseases, such as Tay-Sachs disease, Gaucher's disease, familial dysautonomia, and two different forms of hereditary breast cancer (BRCA1 and BRCA2), and these diseases are up to 100 times more common in Ashkenazi Jews than in other European populations.⁵³

They go on to argue that these diseases “have effects that could plausibly boost intelligence” and that Tay-Sachs disease produces “increased levels of a characteristic storage compound (GM2 ganglioside), which causes a marked increase in the growth of dendrites, the fine branches that connect neurons.”⁵⁴ Neither is this proof of a genetic inheritance of intelligence, and nor is it real science, since it ignores an enormity of cultural factors that distinguish Judaism from other cultures. We see here not a word about cultural factors, such as the emphasis within Judaism on education and study and the resulting early language acquisition required for such study, the study of the Torah being one of the commandments (mitzvah) of Judaism.

Harpending and Cochran's chapter is a re-working of an article entitled “Natural History of Ashkenazi Intelligence,” which received substantial attention. In a *New York Magazine* feature entitled “Are Jews Smarter?,” Jennifer Senior nicely summarizes some of the more pointed responses:

[...] the fact that it did not meet the standards of traditional scientific scholarship, Harpending and Cochran's paper attracted a barrage of criticism from mainstream geneticists, historians, and social scientists.

“It's bad science—not because it's provocative, but because it's bad genetics and bad epidemiology,” says Harry Ostrer, head of NYU's human-genetics program.

“I see no positive impact from this,” says Neil Risch, one of the few geneticists who's dipped his oar into the treacherous waters of race and genetics. “When the guys at the University of Utah said they'd discovered cold fusion, did *that* have a positive impact?”

“I'd actually call the study bullshit,” says Sander Gilman, a historian at Emory University, “if I didn't feel its idea were so insulting.”⁵⁵

Indeed, as Senior goes on to note, “the problem with theories that exploit stereotypes... [is that] they're titillating, sure, but also handy refuges for the intellectually lazy.”⁵⁶

⁵³ Ibid, p. 188.

⁵⁴ Ibid, p. 200.

⁵⁵ Senior (see References).

⁵⁶ Ibid.

Obviously, it is not all just about genes. In arguing that “there is more to heredity than genes,” Eva Jablonka and Marion Lamb cogently explain in *Evolution in Four Dimensions*,

Molecular biology has shown that many of the old assumptions about the genetic system, which is the basis of present-day neo-Darwinian theory, are incorrect. It has also shown that cells can transmit information to daughter cells through non-DNA (epigenetic) inheritance. This means that all organisms have at least two systems of heredity. In addition, many animals transmit information to others by behavioural means, which gives them a third heredity system. And we humans have a fourth, because symbol-based inheritance, particularly language, plays a substantial role in our evolution. It is therefore quite wrong to think about heredity and evolution solely in terms of the genetic system. Epigenetic, behavioural, and symbolic inheritance also provide variation on which natural selection can act.⁵⁷

Yet, even in this mindful and careful discussion, the currents are deep and treacherous. Among scientists, the concept of epigenetics, for instance, is by no means uncontentious. Mark Ptashne has defined “epigenetic” as “a change in the state of expression of a gene that does not involve a mutation, but that is nevertheless inherited in the absence of the signal or event that initiated the change.”⁵⁸ A valid scientific basis for the notion is perhaps spotty, and evolutionary biologists have had to contend with “pseudo gene genies”⁵⁹ and “quacks.”⁶⁰

What I’m not proposing here is a search of causal evolutionary sources for the particularities of literary texts (the use of this word over that, the choice of such-and-such clusters of images, the development of this theme or that theme, the writing of so-and-so’s dialogue as X or Y, and so on). So while, as E. O. Wilson puts it, “culture helps to select the mutating and recombining genes that underlie culture,”⁶¹ the story, as he well knows, doesn’t end there; indeed, as he goes on to explain, although “complexes of gene-based epigenetic rules predispose people to invent and adopt such conventions... genes do not specify elaborate conventions such as totemism, elder councils, and religious ceremonies. To the best of my knowledge no serious scientist or humanities scholar has ever suggested such a thing.”⁶² But even if genes did do such things as specify elaborate social conventions, proving this would be an entirely different matter. Understanding material causation will have to look beyond genes and hardwiring but cannot ignore them. The ecophobia hypothesis, therefore, while acknowledging genetic predispositions to certain anti-environment behaviors does not theorize about a humanity condemned to genetic programming, incapable of making ethical choices, a slave to

⁵⁷ Jablonka and Lamb (2005, p. 1).

⁵⁸ Ptashne (2007, p. R233). On some of the disputes associated with the term, see Pearson (2008), References.

⁵⁹ See Rutherford (2015), References.

⁶⁰ See Gorski (2013), References.

⁶¹ Wilson (1998, p. 179).

⁶² Ibid, p. 181.

hardwiring. The ecophobia hypothesis is as much about the ethical choices we make as it is about our genetic inheritance.

It is dubious whether we actually have the capacity to make changes that are necessary for our survival. In his comments about McEwan's *Solar*, Adam Trexler dryly observes that "genes don't grant humans the foresight to prevent extinction."⁶³ The narrative voice in Nathaniel Rich's *Odds Against Tomorrow* takes much the same stance: "evolution ruled against the fearless. The dodo, the most trusting and friendly animal that mankind had ever encountered, was first identified in 1581. The bird was extinct less than a century later."⁶⁴ While climate change is clearly too big for us to see and too slow for us to perceive without the aid of the kind of distancing that history and science offer, it is still a relatively quick thing: relative, that is, to the capacities of life to adapt—hence, as many scholars have noted, we are in the middle of "the sixth extinction."⁶⁵ Our behavior is going to have to change because genes simply won't change quickly enough. For Michael Beard, it will not be people that change: "For humanity en masse, greed trumps virtue. So we have to welcome into our solutions the ordinary compulsions of self-interest."⁶⁶ The materiality of his body, his genetic predispositions, it seems, are the motive force of this novel, and Beard pooh-poohs ethics and virtue as "too passive, too narrow [...] a weak force."⁶⁷ We can't afford to pooh-pooh ethics *or* genes. They are *both* central to our agency, to what we do, to our behaviors, to our participation in the ecophobia/biophilia spectrum.

Conclusion

Perhaps one of the reasons that mainstream media representations of climate change looks so much like the news about terrorism resides in the fact that both climate change and terrorism jerk our nerves about what we can control and what we can't control, about where our agency stops. Serenella Iovino has proposed that "The 'material turn' is the search for new conceptual models apt to theorize the connections between matter and agency on the one side, and the intertwining of bodies, natures, and meanings on the other side."⁶⁸ It is eminently reasonable to see our genes as a profoundly important material, deeply relevant to our anxieties about agency.

It has always seemed to me politically suspect to want to talk about evolution in the same breath as culture, yet it also seems a kind of omission not to do so, not to recognize and explore the position held by some that "the ultimate explanation for cultural phenomena lies in understanding the genetic and cultural evolutionary

⁶³ Trexler (2015, p. 49).

⁶⁴ Rich (2013, p. 62).

⁶⁵ See, for instance, Kolbert (2014), Leakey and Lewin (1996), Heise (2016) and Dawson (2016), References.

⁶⁶ McEwan (2010, p. 172).

⁶⁷ Ibid.

⁶⁸ Iovino (2012, p. 450).

processes that generate them.”⁶⁹ To talk about biophilia meaningfully (and the term is one that has been well received among ecocritics), Wilson insists that we talk within the context of evolutionary biology. To explore genetic materialism, therefore, is to follow through on Wilson’s challenge, and although Wilson has little meaningful to say on the matter of ecophobia, the implications for the topic are clear: theorizing about ecophobia outside of the context of genetic materialism is idle musing.

Wendy Wheeler, whose extensive and pioneering work on biosemiotics is so very productive and inspiring, perhaps should have the final word here. We need, she argues, “radically to reconsider what we might mean when we talk about mind, consciousness, and intentionality,”⁷⁰ and a “view of culture as natural and evolutionary can help us to a more nuanced view of the evolution of ideas, and the value of different aspects of the experience of the human semiotic *Umwelt*.”⁷¹ It is difficult to imagine how the future of material ecocriticism could be otherwise.

References

- Abram, D. (1996). *The spell of the sensuous: Perception and language in a more-than-human world*. New York: Vintage.
- AnimalEQUALITY. (n.d.). <http://www.animalequality.net/food>. Accessed August 30, 2016.
- Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.
- Carroll, J. (2012). *Literary Darwinism: Evolution, human nature, and literature*. New York: Routledge.
- Carroll, J. (2015). Biocultural theory and the study of literature. *Comparative Literature*, 67(1), 21–28.
- Cochran, G., & Harpending, H. (2009). *The 10,000 year explosion: How civilization accelerated human evolution*. New York: Basic Books.
- D’Amato, P. (2014). *The meaning of Marxism*. Chicago: Haymarket Books.
- Darwin, C. (1996 [1859]). *The origin of species*. Oxford: Oxford University Press.
- Dawson, A. (2016). *Extinction: A radical history*. New York: OR Books.
- Egan, G. (2015). *Shakespeare and ecocritical theory*. London and New York: Bloomsbury.
- Estok, S. C. (2013). Reading ecoambiguity. *Ecozon@: European Journal of Literature, Culture and Environment*, 4(1), 130–138.
- Estok, S. C. (2015). Tracking ecophobia: The utility of empirical and system studies for ecocriticism. *Comparative Literature*, 67(2), 29–36.
- Estok, S. C. (2017). Anthropocene, what anthropocene? The city and the epoch in *A Fine Balance and The Dog. Concentric: Literary and Cultural Studies*, 42(1), 33–50.
- Favareau, D. (2010). Chapter 1: Introduction: An Evolutionary History of Biosemiotics. Essential Readings in Biosemiotics: Anthology and Commentary. *Biosemiotics*, 3, 1–77.
- Feder, H. (2014). *Ecocriticism and the idea of culture: Biology and the bildungsroman*. Farnham and Burlington: Ashgate.
- Fromm, E. (1973). *The anatomy of human destructiveness*. New York: Holt, Rinhart, and Winston.
- Gorski, D. (2013). Epigenetics: It doesn’t mean what quacks think it means. *Science-based medicine: Exploring issues and controversies in science and medicine*. <https://www.sciencebasedmedicine.org/epigenetics-it-doesnt-mean-what-quacks-think-it-means/>. Accessed July 10, 2016.

⁶⁹ Richerson and Boyd (2004, p. 238).

⁷⁰ Wheeler (2014, p. 69).

⁷¹ Wheeler (2008, p. 148).

- Gottschall, J., & Wilson, D. S. (2005). Introduction: Literature—a last frontier in human evolutionary studies. In J. Gottschall & D. S. Wilson (Eds.), *The literary animal: Evolution and the nature of narrative* (pp. xvii–xxvi). Evanston: Northwestern University Press.
- Grosz, E. (2008). Darwin and feminism: Preliminary investigations for a possible alliance. In S. Alaimo & S. Hekman (Eds.), *Material feminisms* (pp. 23–51). Bloomington and Indianapolis: Indiana University Press.
- Heerwagen, J., & Orians, G. H. (1993). Humans, habitats, and aesthetics. In S. R. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis* (pp. 138–172). Washington, DC: Island Press.
- Heise, U. (2016). *Imagining extinction: The cultural meanings of endangered species*. Chicago: University of Chicago Press.
- Iovino, S. (2012). Stories from the thick of things: Introducing material ecocriticism. *ISLE: Interdisciplinary Studies in Literature and Environment*, 19(3), 448–460.
- Iovino, S., & Oppermann, S. (2014). Introduction: Stories come to matter. In S. Iovino & S. Oppermann (Eds.), *Material ecocriticism* (pp. 1–17). Bloomington and Indianapolis: Indiana University Press.
- Jablonka, E., & Lamb, M. J. (2005). *Evolution in four dimensions: Genetic, epigenetic, behavioral, and symbolic variation in the history of life*. Cambridge: Massachusetts Institute of Technology Press.
- Kellert, S. R. (1993). The biological basis for human values of nature. In S. R. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis* (pp. 42–69). Washington, DC: Island Press.
- Kolbert, E. (2014). *The sixth extinction: An unnatural history*. New York: Picador.
- Leakey, R., & Lewin, R. (1996). *The sixth extinction: Patterns of life and the future of humankind*. New York: Anchor.
- Leopold, A. (1949). *A sand county almanac and sketches here and there*. New York: Oxford University Press.
- Lewontin, R. (1979). Sociobiology as an adaptationist program. *Systems Research and Behavioural Science*, 24(1), 5–14.
- Love, G. (2003). *Practical ecocriticism: Literature, biology, and the environment*. Charlottesville and London: University of Virginia Press.
- McEwan, I. (2010). *Solar*. New York: Vintage Press.
- Medveš, A. (2014). Crow rescue. https://www.youtube.com/watch?v=gJ_3BN0m7S8. Accessed September 03, 2016.
- Pearson, H. (2008). Disputed definitions: Epigenetic. *Nature*, 455(23), 1024.
- Ptashne, M. (2007). On the use of the word ‘epigenetic’. *Current Biology*, 17, R233–R236.
- Rich, N. (2013). *Odds against tomorrow: A novel*. New York: Picador.
- Richerson, P. J., & Boyd, R. (2004). *Not by genes alone: How culture transformed human evolution*. Chicago and London: University of Chicago Press.
- Roach, J. (2001). Fear of snakes, spiders rooted in evolution, study finds. In *National Geographic*. http://news.nationalgeographic.com/news/2001/10/1004_snakefears.html. Accessed September 03, 2016.
- Robisch, S. K. (2009). The woodshed: A response to ecocriticism and ecophobia. *ISLE: Interdisciplinary Studies in Literature and Environment*, 16(4), 697–708.
- Rutherford, A. (2015). Beware the pseudo gene genes. In *The Guardian*. <https://www.theguardian.com/science/2015/jul/19/epigenetics-dna-darwin-adam-rutherford>. Accessed July 10, 2016.
- Senior, J. (n.d.). “Are Jews smarter?” In *New York Magazine*. <http://nymag.com/nymetro/news/culture/features/1478/index1.html>. Accessed September 11, 2016.
- Thornber, K. L. (2012). *Ecoambiguity: Environmental crises and east Asian literature*. Ann Arbor: The University of Michigan Press.
- Trexler, A. (2015). *Anthropocene fictions: the novel in a time of climate change*. Charlottesville and London: University of Virginia Press.
- Ulrich, R. S. (1993). Biophilia, biophobia, and natural landscapes. In S. R. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis* (pp. 73–137). Washington, DC: Island Press.
- Wheeler, W. (2006). *The whole creature: Complexity, biosemiotics and the evolution of culture*. London: Lawrence and Wishart.
- Wheeler, W. (2008). Postscript on biosemiotics: Reading beyond words—and ecocriticism. *Earthographies: Ecocriticism and culture. New Formations: A Journal of Culture/Theory/Politics*, 64, 137–154.
- Wheeler, W. (2011). The biosemiotic turn: Abduction, or, the nature of creative reason in nature and culture”. In A. Goodbody & K. Rigby (Eds.), *Ecocritical theory: New European approaches* (pp. 270–282). Charlottesville and London: University of Virginia Press.

- Wheeler, W. (2014). Natural play, natural metaphor, and natural stories: Biosemiotic realism. In S. Iovino & S. Oppermann (Eds.), *Material ecocriticism* (pp. 67–79). Bloomington and Indianapolis: Indiana University Press.
- Wilson, E. O. (1984). *Biophilia: The human bond with other species*. Cambridge: Harvard University Press.
- Wilson, E. O. (1992). *The diversity of life*. Cambridge: Harvard University Press.
- Wilson, E. O. (1998). *Consilience: The unity of knowledge*. New York: Knopf.