Vital Reenchantments: Biophilia, Gaia, Cosmos, and the Affectively Ecological

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Published by Punctum Books


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Not all charms fly at the touch of cold philosophy.¹ This work examines so-called “cold philosophy,” or science, that does precisely the opposite — rather than mercilessly emptying out and unwrapping, it operates as a philosophy that animates. Taking up a selection of popular works by scientists who have engaged in attempts to rail against the idea of disenchantment (Entzäub rung) first introduced by Max Weber, it investigates the concepts and strategies of scientific reenchantment. It demonstrates how the “poet-in-scientists”² operating during the late 1970s and ’80s direct our attention to the marvelous unfolding of life in the world and the cosmos. Both in terms of the subjects they take up and the ethics they espouse, these figures attempt to turn science to life in an age in which the counter-culture in particular had made the institution of science synonymous with technologies of destruction and alienation. What is so unique about them is that they reenchant without pandering to what Dawkins will later term “cosmic sentimentality”³ — Carl Sagan may have

said “We are made of starstuff,” but he would never insist, as Joni Mitchell did in 1969, that “we’ve got to get ourselves back to the garden.” Instead, they insist on a third way that does not rely on the idea of an ecological Eden — a vigorously vital materialism in which the affective trumps the sentimental. Although not without its precedents, this vital materialism has found unique expression in the set of works I will discuss. Its reverberation in ecological circles (and well beyond), moreover, merit the works’ reevaluation. Far from existing merely as books that popularize science, these works reanimate a world that was, in any case, never really dead.

More concretely, this book looks at what I call “affective wonder,” understood as the experience of and attunement to novel affects, within a selection of works by E.O. Wilson, James Lovelock, and Carl Sagan. Although the works it focuses upon, namely *Biophilia* (1984), *Gaia* (1979), and *Cosmos* (1980), were all published within five years of one another during what one might reasonably still call the dawn of the environmental movement, the concepts they flesh out have continued to circulate since their publication and live on in ecological and popular thought today; they elaborate what I will call affective ecologies. I will also insist that their historical emergence was no accident: They respond to an ever-deepening sense of environmental crisis, certainly, but along with it they respond to perhaps more than marginally related narratives of the large-scale disenchantment brought on by modernity or science. More often than not, they respond to a mixture of the two.

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Their mode of reenchanting may thus be understood as vital in three senses: first, in their celebration of the bountiful and precarious life on Earth; secondly, in the manner in which they reverberate with and prefigure the scientifically informed “vital materialism” appearing in the twenty-first century; and thirdly, in their orientation towards the most basic ecological concerns—the protection and maintenance of life and living systems. As Jane Bennett writes, “To be enchanted is, in the moment of its activation, to assent wholeheartedly to life—not to this or that particular condition or aspect of it but to the experience of living itself.” In reaching out to science in order to reenchant, these authors also insist on its life-affirming qualities and the potential it has to serve as an ally in ecological struggles.

This orientation toward and affirmation of life is neither new nor anomalous, although this work does make the claim that this set of popular science writers embrace and direct us to life in unique and unprecedented ways. There is a rich history of scientifically-informed vitalism and cultural production surrounding it. Indeed, the literary scholar Robert Mitchell has gone so far as to locate three vitalist waves, the first coinciding with the Romantic period at the end of the eighteenth and beginning of the nineteenth century: “a transnational European affair, as British, French, and German physicians, surgeons, philosophers, and literary authors struggled to understand the relationship of a “principle of life” that seemed to animate and con-

8 This, as will become more clear in the following chapters, is life understood not merely as organisms we immediately recognize as creaturely. Indeed, there is no precise definition of life to be found in these pages; the closest we might come is in Lovelock’s assertion, appearing in Chapter 4 of Gaia, that it is “something edible, lovable, or lethal.” As Lynn Margulis and Dorion Sagan astutely observe, “Life, although material, is inextricable from the behavior of the living. Defying definition—a word that means ‘to fix or mark the limits of’—living cells move and expand incessantly. They overgrow their boundaries; one becomes two become many” (What Is Life? Berkeley and Los Angeles: University of California Press [1995], 4). Life, even in the works here that orient themselves towards the natural sciences, is understood more in relation to what it does than what it is.

9 Bennett, Enchantment, 159–60.
nect living beings to the concrete matter of which these bodies were composed.\textsuperscript{10} The second, according to Mitchell, occurred at the turn of the following century and might be associated with neo-vitalists such as Hans Driesch, as well as “life philosophers” such as Nietzsche, Scheler, and Bergson.\textsuperscript{11} The final wave, which began towards the end of the twentieth century, he refers to as “the vital turn.” This period is characterized by increasing numbers of philosophers, literary scholars, and cultural critics growing dissatisfied with “the exclusive emphasis of poststructuralist thought on representations and signs” and attempting to grapple in different ways with the “ontological dimensions of vitality that exceed, or stand as the conditions of possibility of, semiotics and representation.”\textsuperscript{12} In this context, Mitchell mentions Giorgio Agamben’s “bare life” and Butler’s “precarious life,” but one could as easily understand the movement in cultural studies towards ecological questions, first in the form of ecocritical efforts, and now in the development and explosive growth of the ecological humanities, as belonging to this vital turn. This book, as well as the works it investigates and the majority of the theory that it draws upon, is anchored in this third wave but is constantly haunted, particularly in its reliance on Jakob von Uexküll’s thought, by the two that came before it.

With this long and varied vitalist history in mind, Wilson, Lovelock, and Sagan are, predictably, not the only figures that stand for a kind of “scientific reenchantment,”\textsuperscript{13} but they do of-


\textsuperscript{11} Ibid.

\textsuperscript{12} Ibid., 1–2.

\textsuperscript{13} We might also add Stephen Hawking, Richard Dawkins, and Stephen Jay Gould to the list of celebrity scientist writers of popular science operating in the 1980s. Although these authors certainly rely on some of the tactics associated with affective wonder that I will outline later, they are less concerned with linking experience, whether their own or that of the reader, to their claims, nor are they especially attentive to more broadly ecological concerns. Thus, while a more exhaustive study might include them, I have chosen to attend here to texts that more explicitly concern themselves with the earth and, on very fundamental levels, what humans do on its surface.
fer their own particular flavor of it. Not only do they discuss wonder and its analogs (awe, amazement, marvel), but as author figures they are wonder machines, perpetually describing fits of it and pointing the reader to the sources that might occasion it. Time after time, moreover, these poet-in-scientists undermine the separation between subject and object traditionally characterizing the scientific gaze and, in a great many narratives, modern disenchantment. The “felt reality of relation”\textsuperscript{14} eclipses attempts to understand and communicate the world in supposedly objective terms. The works explored here are also united by their pleas for and explorations of new modes of attentiveness, ones that consistently challenge both the boundaries of the human \textit{Umwelt}\textsuperscript{15} in absolute terms and the notion that we can draw any clear distinction between our own bodies and the matter that surrounds them. Although billed as popular science, they do more to offer an “ecology of affect” than to flesh out, in any detail, the assumed workings of our immediate biological surroundings, the larger Earth system, or, for that matter, the universe. Far from laying out a coherent ecological program, these works serve, rather, as fragmentary guides to “being at home in the universe.”\textsuperscript{16} That they often evoke mystical or quasi-religious experience is not merely an exception to their self-proclaimed secular-scientism, but integral to the kind of enchanted science they offer.


\textsuperscript{15} Defined here as the subjective surroundings of an organism; the term is discussed at length in 2.3.2.

\textsuperscript{16} As such, they might also be described as embodying a peculiarly American kind of spirituality. See William Clebsch, \textit{American Religious Thought} (Chicago: University of Chicago Press, 1973), 1.
1.1

Reenchantment Now

No doubt this talk of enchantment and wonder, so tied to immediate experience, can seem trivial in the face of any number of environmental crises (global warming first among these) that do not just appear ominously on the horizon, but loom as never before. My first task here is thus to pose the same question that Jane Bennett does at the end of her own work on enchantment: “How can someone write a book about enchantment in such a world?”17 Does this approach really provide, as Latour phrases it, “a way to bridge the distance between the scale of the phenomena we hear about and the tiny Umwelt inside which we witness, as if it were a fish inside its bowl, an ocean of catastrophes that are supposed to unfold”?18 I will argue throughout this work that this is precisely what “affective ecologies,” properly attended to, point toward: an open present, one that broadens the horizons of the “fish bowl” and allows us to imagine engendering futures that are neither naively hopeful nor hopelessly apocalyptic. This section begins, however, with the catastrophic futures alluded to by both those in ecological camps and politics. Although I have no desire to paint a less bleak picture of what may happen should we choose to do nothing to alter our engagement with the ecosphere, and the works examined here do nothing to sugar-coat ecological crisis, I question the efficacy of these tactics. What I argue for, in place of or as a supplement to this “futurespeak,” is a more modest ethics of the present — an exploration of human ecological potential that might lead to a more fundamental reexamination of our relations with the earth. Essential to this is not the dripping sentimentalism so characteristic of approaches that stress, above all else, the future and the figure of the child, but the “affectively ecological,” which both encourages

17 Bennett, Enchantment, 159.
more fundamental attachments to the world and calls attention to those that already exist.

1.1.1. Benign neglect: the case against the child
The most basic motivation behind the turn to the affectively ecological in this project is the idea that the obsessive orientation towards the future that characterizes a great deal of modern ecological calls-to-arms bears no relation to the tools that might actually assist in averting, or at least softening the blow of, environmental crisis. Indeed, this refusal to dwell in the ecological present, far from causing us to consider future human generations in our actions (let alone the organisms that might win out in deep time), severely limits the horizon of ecological politics. What if, rather than focusing on the image of the lone polar bear floating away on the last bits of the polar icecaps, one poses a different kind of question? What becomes of ecological ethics and politics, broadly speaking, when one focuses not on the hourglass that shows our time running out, but the infinite variety of the sand that marks it?

But the metaphor of the hourglass, perhaps, requires some contextualizing. Enter Brittany Trilford, the seventeen-year-old chosen to give the opening address at the 2012 Rio Summit (the follow-up to the Earth Summit twenty years prior). “You have 72 hours to decide the fate of your children, my children, my children’s children,” she proclaimed. “And I start the clock now. Tick, tick, tick.” Very little came of this countdown-as-threat: no binding policy treaties were signed, but merely an “outcome document” entitled “The Future we want.” This ominous “tick-tick-ticking,” surely also meant to convey the imminence of environmental crisis and possibly apocalypse, rather than

19 Brittany Trilford, “Are You Here to Save Face — or Us?,” Democracy Now, June 20, 2012, http://www.democracynow.org/2012/6/21/are_you_here_to_save_face.
impacting urgency, became the sound of the unfulfilled present — opportunity wasted.

Twelve-year-old Severn Suzuki had made a similar plea in Rio twenty years earlier, in 1992. “You grownups say you love us,” she intoned at the end of her speech. “I challenge you, please make your actions reflect your words.”21 This tugging at the reproductive heartstrings hardly constitutes an anomaly. That the primary motivation for acting now is to save the species later is assumed by a great variety of sources, whether grassroots in origin or from more official channels. Sarah Ensor points to the popular environmentalist slogans, “What will your children breathe?” and “We don’t inherit the earth from our grandparents. We borrow it from our children.”22 But documents more oriented towards institutional politics, the Earth Charter, for instance, also consistently invoke “future-speak”: “We stand at a critical moment in Earth’s history, a time when humanity must choose its future.”23 Barack Obama’s famously bold statement (at least by American standards), uttered during his second inaugural address, was “We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations.”24 In classical texts of environmental ethics, for instance, those by Hans Jonas, the task of securing the future of the species is taken as the most pressing task, without which, supposedly, no other ethics would be possible.25

At one level, of course, this is true; there are no ethics, as we currently understand them, without ethical actors. More recent academic texts are hardly immune to this stubborn orientation towards some vague tomorrow, either. Alistair McIntosh asks, “How do we create the means to empathize with people we may never meet, in a future we may never inhabit?” Needless to say, no one bothers to justify why we should, let alone must, cultivate this kind of empathy. These appeals evoke realities different from our own, yet they refuse to articulate these differences and, in so doing, bring us no closer to a “greener future.” Notably, neither the Kyoto Protocol nor The Paris Agreement, to date the most significant environmental treaties, appeal to the future or the child.

Nothing can be said against these appeals to the child, unless one joins up with the Voluntary Human Extinction Movement (VHEMT), but no praxis can follow from them either. The problem with “loving our children,” with orienting ourselves exclusively towards the generations to come, is that it offers no way to begin, no way to tackle the present. My point is not that we ought to entirely disregard the future — we would certainly be

28 “The Paris Agreement,” United Nations Framework Convention on Climate Change, November 4, 2016, http://unfccc.int/paris_agreement/items/9485.php. Paragraph 19 of the preamble does mention children and intergenerational equity when making the case that “climate change is a common concern of humankind,” but these concerns are mentioned alongside the obligation to protect “human rights, the right to health, the rights of indigenous peoples, local communities, migrants” and a number of other historically disenfranchised groups.
29 The slogan for the movement, positioning members as a new Vulcan order, is “May we live long and die out.” See “About the Movement,” Voluntary Human Extinction Movement, http://www.vhemt.org/aboutvhemt.htm#vhemt.
in trouble if we did — but rather that we ought to question the
efficacy of this approach and investigate alternative temporal
engagements with and investments in the ecosphere.

There are at least two reasons to oust, or at the very least mas-
sively supplement, the oppressively future-oriented approach to
environmental ethics. The first is that, far from ushering in a
new social and political order, it limits the horizon of ecological
ethics and politics. Queer theorist Lee Edelman, although not
much of an ecological poster-boy, has brilliantly articulated the
conservatism embedded in a politics that leans so heavily on the
figure of the child. Even radical or progressive politics, he claims,
remains “conservative insofar as it works to affirm a structure, to
authenticate social order, which it then intends to transit to the
future in the form of its inner Child.”30 The problem is that this
forecloses the possibility of doing anything besides recreating
the social order: “That Child remains the perpetual horizon of
every acknowledge politics, the fantasmatic beneficiary of
every political intervention.”31 Thus, ecological pleas which rely
on the child aim, by and large, to extend as many of the “privi-
leges” we enjoy today as features of modern life to the future
but do not necessarily entail any questioning of these so-called
privileges. The green consumerist dream involves little more
than magically green versions of all of our present technologies
distributed (supposedly fairly) among the population. This is a
sly operation, and a problematic one, since any kind of ecologi-
cal provisioning, by most accounts, will likely involve a certain
amount of bloodletting. But constant reference to the child as
the figurehead allows us to maintain the illusion of seamless
continuity with the present. The future, in this way, is endlessly
defered. The minute every thought becomes subordinate to the
perpetuity of the species, we dismiss the possibility that it is the
contemporary political and economic inertia that may, and in
all likelihood will, make the future so unimaginably unpleasant.

30 Lee Edelman, No Future: Queer Theory and the Death Drive (Durham:
31 Ibid.
Edelman asks, provocatively, “What, in that case, would it signify not to be ‘fighting for the children?’” My investigation poses this same question in light of the popular scientific contribution to the environmental movement. Not to be “fighting for the children” certainly doesn’t mean fighting against them or abandoning them altogether, explicitly vHEMT-style. It does, however, involve viewing our present engagement with the ecosphere as more than merely a problem, as containing a great number, an infinite number even, of only partially actualized potentials. The vHEMT’s rejection of “reproductive futurism,” of the “presupposition that the body politic must survive,” provides us with a whiff of fresh air, but no more than that. The ideal of extinction becomes merely another term “that impose[s] an ideological limit on political discourse as such.” Any politics implied by the vHEMT consists of only a smooth transition to the end. The future retains its mysterious stranglehold on us, with the empty, ahuman Arcadian vision merely supplanting the figure of the child.

This leads us to the second reason to question an exclusively future-oriented ecological ethics, which Edelman already begins to allude to when he describes the child as “the pledge of a covenant that shields us against the persistent threat of apocalypse now — or later.” The constant invocation of the child and the future in the realm of ecological politics has become a kind of mindless mantra, betraying, somewhat counterintuitively, an “endless preoccupation with the end times,” a complete inabil-

32 Ibid., 3.
33 This is where I depart from Edelman; while he might support the vHEMT as a quite literal embrace of the death drive (and this is purely hypothetical), I reject it for this selfsame reason — there is no ecological footing to be found in No Future. Nicole Seymour dismisses his work on the same grounds, while, like me, noting its usefulness for a critique of ecological conservatism. See Strange Natures: Futurity, Empathy, and the Queer Ecological Imagination (Urbana: University of Illinois Press, 2013), 7.
34 Edelman, No Future, 2, 3.
35 Ibid., 18.
vital reenchantments

ity to think ourselves out of the trajectory offered by the present moment. We speak of the children, in other words, like those on their deathbeds.

The hope, the rationale, of course, is that talk of the future, and especially the end times, will change our course of action in the present. This emphasis on disaster scenarios has been termed “catastrophism” by theorists. Lilley, however, observes: “Catastrophists tend to believe that an ever-intensified rhetoric of disaster will awaken the masses from their long slumber — if the mechanical failure of the system does not make such struggles superfluous.” Appeals to the future in peril, the child without the privilege of a childhood, become the gospel and the revelation here. Lilley points to the evidence that, far from stirring people to action, warnings about “fixed ecological tipping points typically fall on deaf ears or result in greater apathy.” Bucking the system is hard when the threat of apocalypse weighs so heavily, and articulating precisely how heavily these threats weigh can actually become a disincentive for change. Calls to face the future, to save the children, thus overwhelmingly result in us adhering ever more stubbornly to contemporary realities. And yet, time still marches on. Donna Haraway even puts an affective spin on the consequences of catastrophism, writing, “There is a fine line between acknowledging the extent and seriousness of


Catastrophism, it should be noted, first appeared as a nineteenth-century theory of geological change, which, in opposition to the prevailing uniformitarianism, contended that “certain geological and biological phenomena were caused by catastrophes, or sudden and violent disturbances of nature, rather than by continuous and uniform processes” (Oxford English Dictionary Online, s.v. “catastrophism,” https://en.oxforddictionaries.com/definition/catastrophism). The discussion of the Anthropocene in the last chapter will return to the intersection between theories of the geological and the role of the human.

Lilley, Apocalyptic Politics, 1.

Ibid., 5.
the troubles and succumbing to abstract futurism and its affects of sublime despair and its politics of sublime indifference.”

Turning to the dynamics that make up the present, on the other hand, allows us not only to think of radically different investments in the ecosphere (ones that might incidentally end up actually saving “the children”) but also potentially allows us to break out of the sense of paralysis that catastrophism produces.

1.1.2. An ethics of the present

This book neither concerns itself with what our children will breathe, nor with condemning contemporary decadences. It is, rather, an exploration of the modes that select works of popular science have given us of opening up the present and allowing us to reconsider our most fundamental relations with that which surrounds us. In this sense, any ethics it espouses are decidedly Spinozan, having “nothing to do with a morality,” but rather constituting “an ethology, that is, a composition of fast and slow speeds, of capacities for affecting and being affected on this plane of immanence.” The crucial difference between ethics and morality, as Deleuze frames it, is that while a morality “always refers existence to transcendent values,” an ethics is “a typology of immanent modes of existence.”

If anything, then, what the works in this book present us with is an experimental ethics, relying on the uncertainty of “not know[ing] beforehand what good or bad you are capable of; […] what a body or mind can do, in a given encounter, a given arrangement, a given combination.” This is an ethics operating at the micro-level rather than at international summits and in legislation. It constitutes no direct alternative to sustainability-oriented ethics, but it does, I hope, loosen the chains that so much talk of the future and the child has thrown around our collective neck (to the extent that it’s even fair to speak of our predicament as

41 Deleuze, *Spinoza*, 125.
42 Ibid., 23.
43 Ibid., 125.
Sarah Ensor has already referred to such an approach as “spinster ecology,” which she claims amounts to “an avuncular form of stewardship, tending the future without contributing to it.” Such an approach does not deny the existence of tomorrow, but problematizes whether it is as simple as deciding you want a future and then magically “making it happen.” She continues, “Perhaps the question is not the future, yes or no, but the future, which and whose, where and when and how.” Instead of speaking the language of constraint or technological domination, these more fleeting, possibly less responsible spinster ethics concern themselves with maximizing ecological subjectivity.

Indeed, one might better understand this kind of ethics as a disposition, or along with Jane Bennett, as “an embodied sensibility.” Bennett argues that the carrying out of any moral code requires an affective basis, the disposition to “enact the code.” She insists that, in addition to a sense of duty, the implementation of any kind of ethics involves “bodily movements in space, mobilizations of heat and energy, a series of choreographed gestures, a distinctive assemblage of affective propulsions.” This does something to explain, already, why a sustainability ethic alone — an imperative to save the children — is not enough. One might speculate that the mania surrounding slow food, and perhaps other aspects of green con-

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44 See also the emergence of queer ecologies, many variants of which also question reproductive futurist justifications for “saving” the environment. See *Queer Ecologies: Sex, Nature, Politics, Desire*, eds. Catriona Mortimer-Sandilands and Bruce Erickson (Bloomington: Indiana University Press, 2010).


48 Ibid.

49 Ibid., 3.
sumerism as well, constitutes efforts to fill precisely this gap. Any ethical praxis, seen this way, cannot follow from duty alone.

But it is not only that affective dimensions are necessary for the enactment of more principled ethics. Bennett also frequently alludes to the idea that ethical behavior begins with “a spirit of generosity” or a joy that “can propel ethics.”

In this sense, enchantment, or “the cultivation of an eye for the wonderful” (the affective elements of which I will discuss in the next chapter), far from constituting a luxury, becomes a necessity and “an academic duty.” Bennett insists, as I also do in Chapter 2, that enchantment, though it may come as a surprise, is also something that may be “fostered through deliberate strategies.” This book examines what these strategies of enchantment might look like and how wonder may be instigated. I have chosen to focus on this seemingly narrow spectrum of texts, popular scientific writing from the late 1970s to the early 1980s, because it offers a number of “enchanting techniques” that I argue are more relevant now than ever.

It should be stressed, however, that there is a longer history of reenchantment, and this project engages only with one incarnation of it. There is, for instance, already a rich late nineteenth- and twentieth-century Western (not to mention Eastern) counter-tradition of intensively engaging with the present. Nigel Thrift points to precisely this when he claims that “a go-faster world, in which time takes on an increasingly frenetic future-oriented quality, has been balanced by a series of contemplative practices — many of them to do with a heightened awareness of movement — which have, in fact, produced an expansion of awareness of the present.” Although he explicitly focuses on many New Age practices of contemplation, body techniques like the Alexander and Feldenkrais techniques, and the rise

50 Ibid., 3, 4.
51 Ibid., 131.
52 Ibid., 4.
of photography (“which is able to capture transience”54), one could as easily point to the self-conscious seeking out of predominantly nonhuman environments or wildernesses and the attendant popularization of activities like hiking or literature such as nature writing. But popular science, too, I will argue, can produce “an expanded awareness of present time”;55 if it does anything, it asks us to attend to what is right in front of us, the reader, and forget about its self-evidence. Just as Thrift claims of the practices he examines, the works I focus on work to reenchant the world by setting up what he terms a “background of expectation.”56 The implication is always either that there is far more to be discovered than meets the eye, or, alternatively, that the eye, given free reign, is able to discover far more than we may have thought possible. What is vitally important is this excess of things, living things especially, and, as we will return to in the next chapter, their contingency: There is always more, and this more could always change.

Lest my own or Thrift’s approach begin to sound like much of the talk of “slowing down” or “deceleration”57 found in the media and academia, it should be pointed out that attending to the present does not at all automatically imply a slowness. Thrift contends that the notion that we live in a “speeded-up” world is itself a kind of technological determinism and part of the discourse of modernism, noting that “nature is actually very fast.”58 Whether attending to the present involves a slowing-down or a speeding-up is as much a matter of scale as that to which one is attending. In the context of this work, the connections between organism and Umwelt are more important than a vaguely new age kind of slowing down. Indeed, the authors I focus on would be among the first to point out that on a cellular, not to mention

54 Ibid., 43.
55 Ibid., 35.
56 Ibid.
galactic, level, things operate far faster than we can perceive, and often faster than we can even comprehend.

Indeed, what the poet-in-scientists I examine contribute cannot be described as a naïve carpe diem-ism; they do not give directions for seizing time, nor for slowing it down. I am doubtful whether any of them would assent to the conviction that it need be slowed down; Sagan and Lovelock, at least, might be described as careful technological optimists. What they do provide are techniques for allowing time to seize the subject, to participate more conscientiously and attend more fully to the “pure becoming”\(^59\) that Deleuze, via Bergson, argues constitutes the fleeting present. Far from being some kind of stasis that we may fix and inhabit, this vision of the present is flux. When we talk about the “openness of the present,” then, it refers to this non-fixity, these infinite varieties of “pure becoming” — not one’s ability to control it. And if affect is that which is “experienced in a lived duration that involves the difference between two states,”\(^60\) it is precisely what constitutes this dynamic present.

What may be unique about wonder or reenchantment, as will be discussed in the next chapter, is that it involves a suspension in the general orientation toward the future. Martha Nussbaum, one of the few contemporary authors to theorize wonder, regards wonder as non-eudaimonistic, as one of the only emotions not connected to one’s own “goals and projects,”\(^61\) and I hold to this as well. To the extent that wonder involves the attunement to or recognition of new affects and exists, as we shall describe it in Chapter 2 as a kind of primary affect, it directs the wonderer to the present. That a science seeking to reenchant should rely so heavily on wonder is no accident, either. If the disenchanted and disenchanting science of modernity was to usher in the future, Wilson, Lovelock, and Sagan ask us to pay more attention to that which is happening right now in front of us (whether

60 Deleuze, *Practical Philosophy*, 125.
that means in the soil or the skies, or somewhere else entirely). While on one level the texts I investigate here look merely like a series of scientific tricks or unveilings, on another level, they seek to catalog the unseen potentials of the world around us and to provide at least a taste of what techniques of attention can reveal. In so doing, I argue, they set up the kind of background of expectation that would be necessary for any successful long-term sustainability ethic. The poet-in-scientists of this project, in contrast to their more overtly political contemporaries, abandon the child altogether, opting instead for the exploration of the chaotic potentials of the field. Precisely what this amounts to in the context of this work, and how this can be understood in the context of popular science more generally, will be explained in what follows.

1.2

Popular Science and the Affectively Ecological

What are the strange ties that link the works this book examines? It is easy enough to refer to them, at least on a preliminary basis, as works of popular science, but this distinction, without further explanation, reveals very little and does nothing to clarify the relation between the works and the affective ecologies I claim they present.

1.2.1. Popular science: what’s left when you take away the facts?
The scattered scholarly attempts to come to terms with popular science begin in the 1980s with the extremely unhelpful assertion that the genre is merely science popularized.62 Richard

62 Not only are scholarly treatments of popular science few and far between, but at the time this project was embarked upon, there had been no substantial volumes dedicated to the subject released in the twenty-first century, despite the continuing popularity of authors such as Richard Dawkins, Stephen Hawking, and Neil deGrasse Tyson. Sarah Tinker Perrault’s Communicating Popular Science: From Deficit to Democracy (New York: Palgrave Macmillan, 2013) is a welcome addition to the field.
Whitley, in one of the first examinations of the formal features of the genre, points to its startling range (from TV shows to textbooks to articles in popular science magazines to books) and argues that the defining feature of popular science is simply the “transmission of intellectual products from the context of their production to other contexts.”\(^63\) The farther these works stray from contexts in which science is being conducted, Whitley argues, the lower the “degree of formalisation and technical precision used to communicate results.”\(^64\) For Whitley, to put it bluntly, popular science is merely science dumbed down.

While the language employed in popular science certainly can be described as less technical, scholars in the 1990s take issue with Whitley’s idea of popular science as simply watered-down science brought to the masses. Popular science, for Murdo McRae, as well as for the purposes of this work, is not merely science out of context, but something of an entirely different order. McRae argues that, for this reason, we ought to refer to “literature of science” as opposed to “popular science.”\(^65\) While I don’t feel it necessary to go as far as rejecting the term “popular science” entirely, two features of McRae’s “literature of science” are important for the works I examine here. The first is that they are “open to as full a range of contemporary interpretative techniques as any other works of literature.”\(^66\) Indeed, if Wilson refers to himself and scientists like him who have a

Nevertheless, it focuses primarily on the manner in which popular science mediates between the public and the scientific academy, largely glossing over the abundance of claims in popular science that are not strictly scientific.

\(^64\) Ibid., 14.
\(^66\) Ibid., 10.
popular bent as “poet-in-scientists,” he invites this treatment himself. The second reason that McRae employs the term is that “[i]t emphasizes that the literature of science must be read not as mere popular transmission of superior scientific knowledge but as sophisticated production of knowledge in its own right.”

Popular science may be part science communication, but it is also awash in literary and political strategies that relate to the science itself only peripherally. Thus, while this work focuses on works of popular science, there will neither be much science nor any substantive exploration of the more technical elements of the books.

What is of much more interest here is what Jean Fahnestock, in the same volume, refers to as the epideictic— that which concerns “a judgment over whether something deserves praise or blame.” Fahnestock isolates two kinds of epideictic appeals made in popular science: “the ‘wonder’ and the ‘application’ appeals, corresponding to the deontological and teleological appeals in ethical argument.” While there are some application appeals to be found in popular science relating to, for instance, policy implications of scientific findings, what predominates are the deontological, “wonder” appeals: “In science popularizations, all references to the amazing powers and secrets of nature or to the breakthroughs and accomplishments of the scientists themselves are basically deontological appeals.” Wonder, understood very generally, may be regarded in this way as a feature of the genre of popular science itself. The type of wonder I will argue is pursued by Wilson, Lovelock, and Sagan, however, is a unique embodiment of this tendency within the genre. The popular science of these works does something that goes far beyond the communication of supposed scientific fact. As we will see,

67 Ibid., 10–11.
69 Ibid., 20.
70 Ibid., 19.
the celebratory, epideictic element of popular science extends to the scientist’s connection to and embeddedness in supposed objects of inquiry as much as to phenomena in the world.

1.2.2. Ecology without catastrophism

But for now the urgent question becomes: How can we connect this epideictic, wonder-filled popular science to the ecological? What I wish to argue is that, when we take the science away from popular science, we are not merely left with pulp, but with strategies and traces of wonder that can be patched together to form affective ecologies. While to an extent the entire book is concerned with this, I would be remiss here if I did not begin to sketch what I mean by the affectively ecological, and what these works of popular science from the 1980s, not all of which are strictly about environmental crisis, have to do with it.

The term “affective ecology” was originally used by the psychologist Giuseppe Barbiero, although my understanding of it departs substantially from his. Barbiero’s orientation, in contrast to mine, is overwhelmingly pedagogical. He describes his brand of affective ecology as:

> the branch of ecology that educates people about Nature by bringing them into direct contact with it; indeed, only by immersing oneself within Nature can the energies be rediscovered that can only be restored by establishing the right kind of connection with Nature.71

Barbiero never fully explains what this “right kind of connection with Nature” might look like, nor why we aren’t already immersed in it. “Nature” in this affective ecology stands apart, and the goal, apparently, is a reunion in which the shackles of culture are thrown off. While I share with Barbiero the conviction that more immediate relations in the present must inform approaches to environmental ethics, what I contend, along with the authors

that I examine, is that connection with so-called Nature is inevitable: There is no outside of it. Affective ecology as explored here is about connection, but not to some monolithic entity called “Nature,” and the pedagogical takes a backseat to more fundamental questions about the production of subjectivity.

In this I have been influenced by Guattari’s “virtual ecology,” which he proposes in Chaosmosis.72 In this work, Guattari links the ecological crisis, on a number of occasions, to “a more general crisis of the social, political and existential.”73 He argues that we now operate with mentalities “based on a productivism that has lost all human finality,” when “[t]he only acceptable finality of human activity is the production of a subjectivity that is auto-enriching its relation to the world in a continuous fashion.”74 A tentative solution, for Guattari, involves shifting the discussion of the subject to subjectivity, “taking the relation between the subject and object by the middle and foregrounding the expressive instance.”75 Understood this way, a virtual ecology is not about reconnecting “man and nature,” but the exploration of the infinite manifestations of a subjectivity that is auto-enriching.

Taking this up, the ecological as dealt with here is something much broader than that which is typically recognized by green camps. Although the works I explore in this work do often focus explicitly on environmental crisis and the human role in it, Biophilia and Cosmos do not primarily concern themselves with the havoc humans have wreaked upon Earth systems (although they both touch upon this multiple times). When I group them as ecological, I understand the term in a slightly broader sense. Here, I follow Nicole Seymour in choosing to speak of the ecological rather than, perhaps more concretely, of the environmental. She calls attention to ecology, “in its extended use” as denoting “the relationships between any system and its

73 Ibid., 119.
74 Ibid., 21.
75 Ibid.
environment.” Seymourgoes on to say that this allows her to take into account relationships between social formations and what we might refer to as “the environment.” I conscientiously shy away from the social, both because the texts that I discuss themselves largely steer clear of this dimension and because the scope of this work is already broad enough, but I join Seymournin emphasizing the aspect of interrelation so essential to a broader view of the ecological.

And to the extent that the works I examine aim not only to explain interrelation strictly scientifically but also to transmit a sense of how interrelation feels, they offer up affective ecologies. As stated before, I understand affect here with Deleuze (and Spinoza) as something, “experienced in a lived duration that involves the difference between two states.” Affect is what transpires between — whether one takes states to mean entities or temporalities — and as such forms the very fabric of experience. Notably, Deleuze and Guattari also describe affect as “nonhuman becomings of man.” Affect, in this way, necessarily brings the subject not only to the lived present, but to that outside the self — the very animal, vegetable, or cosmic of which Guattari speaks.

And it is important to recognize that ecological subjects consist, from an affective perspective, of bodies and minds caught in webs, not all of which are immediately obvious to us. Gregory

76 Seymour, Strange Natures, 29.
77 Félix Guattari, in his aptly titled Three Ecologies, trans. Ian Pindar and Paul Sutton (1989; repr. London: Continuum, 2008), himself divides the ecological into three dimensions — “the environment, social relations, and human subjectivity” (19–20). Limiting my discussion to works concerned largely with the first and third of these dimensions was the only way to make coherent claims about interrelation; that I did choose not to lose myself in ecological webs, and, to a certain extent, did choose to draw artificial lines of demarcation, does not mean, however, that I view the social as insignificant.
78 Deleuze, Practical Philosophy, 49.
Seigworth and Melissa Gregg speak of affect’s “open-ended in-between-ness,” which is “integral to a body’s perpetual becoming (always becoming otherwise, however subtly, than what it already is), pulled beyond its seeming surface-boundedness by way of its relation to, indeed its composition through, the forces of encounter.” A body, pulled this way and that, “webbed in its relations” is “as much outside itself as in itself.” The turn to affect includes the acknowledgment of corporeal and energetic indiscerness — the ecological condition itself. That we participate in becoming with the environment because we are constituted by it (and in fact contain it within us) is the first lesson of the ecological, and it is the concept of affect that most fully accepts that the situatedness of the body has consequences that one cannot express in terms of physio-scientific discourses alone.

Employing concepts of affect in ecological contexts should shift the discussion of how humans can survive in the ecosphere to how humans are in the ecosphere, to the production of subjectivity. The focus becomes relational and present-oriented. Affect, I will argue, gives us something that begins to do justice to the human (and the organisms, too, in many cases) relation to the natural world; we get a kind of “incorporeal materialism.” Massumi writes of “accepting the paradox that there is an incorporeal dimension of the body. Of it, but not in it. Real, material, but incorporeal,” of “the felt reality of relation.” This is a line of thought that fully acknowledges the primacy of the material world, but also its literally transgressive character, the strange-ness of visible and invisible flux and energy exchange. Incorporeal materialism contains room for both the virtual (the realm

81 Ibid.
82 Ibid.
83 See Alan Dove, “Microbiomics: The Germ Theory of Everything,” Science 340, no. 6133 (2013): 763–65. Dove writes, “There are more microbial genomes within us than we have human cells. We’re a walking ecosystem.”
84 Massumi, Parables for the Virtual, 5.
85 Ibid., 5, 16.
of affects and potentials) and the actual (the realm of things), which Deleuze describes as falling “from the plane [of immanence] like a fruit.” Put simply, acknowledging something like affect means admitting that sensation cannot necessarily be explained away by or become reducible to the physiological — Massumi phrases affective models as “abstract enough to grasp the incorporeality of the concrete.”

The “affectively ecological” is thus a way of approaching interrelatedness through experience, and this experience consists not only of that to which we can testify and which is measurable, but, as Massumi puts it, “the felt reality of relation.” Indeed, in the texts examined here, the force of reenchantment is very often not what happens per se, but the potential that permeates everything — the virtual as opposed to the actual. While the works here do much to explain interrelation concretely — with other forms of life in the case of Biophilia, the earth itself in Gaia, and the universe in Cosmos — they also seek to describe and evoke the feeling of interrelation, of wonder, and of being (or becoming) at home in the universe. This is, as I will explain more in the individual analyses of the works, their lasting contribution to environmental thought.

1.2.3. Why these works, and why now?
It should be clear by now that I have chosen to focus on these particular works of popular science not because of the way in which they translate science, but because they suggest novel ways of approaching questions of ecological subjectivity. Via popular science, they offer visions of reenchantment that have proven incredibly robust.

This is evident, at the most basic level, in the success of the books themselves and the visibility of their authors, which will be explored in Chapters 3, 4, and 5 in more detail. Cosmos, at the

87 Massumi, Parables for the Virtual, 5.
very least, was a bestseller, and the other works have not been out of print since their publication. The authors are or were all public intellectuals, appearing for academic debates and lectures as well as on TV. Two of the authors, Wilson and Sagan, are Pulitzer Prize winners (although not for the books discussed here).

Even more significantly, however, the concepts so central to the works, introduced in their respective titles, have stuck around. “Biophilia,” in addition to providing the title for Icelandic artist Björk’s 2011 album, has entered psychological as well as architectural and design discourses and crops up often in pop-environmental contexts.\(^8\) It has also become a concept taken up by environmental educators, as evidenced by the E.O. Wilson Biophilia Center, established in 2009 in Florida’s Longleaf Pine ecosystem.\(^9\) “Gaia,” for its part, has gone from a scientific hypothesis to a central part of new age environmentalism and back again. More recently, scholars in the humanities have begun exploring the concept, thanks, in large part, to Bruno Latour’s 2013 Gifford Lectures.\(^9\) *Cosmos*, a TV series airing on PBS before it was published in book form, has been remade and broadcast widely in 2014, this time by a major private network and starring Neil deGrasse Tyson. Despite some changes, the structure of the original 1980 series and the unnarrated moments of wonder occasioned by “the cosmos” remain intact. The perseverance of these concepts in the twenty-first century demands that we take more than an anthropological interest in the books that introduced them.

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Indeed, this kind of investigation would not have been possible in the 1980s. This is, first and foremost, because the theoretical landscape that has so crucially informed this project is more recent. Jane Bennett’s *Enchantment of Modern Life*, referred to above, as well as her more recent *Vibrant Matter*—both of which connect the affective to environmental issues—were not published until 2001 and 2010, respectively. Moreover, it is only really in the twenty-first century that ecocriticism and the ecological humanities have broadened to include approaches that, in the words of Lawrence Buell, deviate from “the self-intoxicated fetishization of greenery as such” and “save-the-world moral earnestness,” and that insist that “the winning move” lies “not in abandoning the concept of nature but in abandoning the idea that culture is something outside *nature*.”

This book is, of course, not the first that brings affect theory to bear on ecological texts, but it is the first to bring it to this group of texts and, to my knowledge, popular science generally. Certainly, the collision this produces, with wonder and reenchantment, one might say, as the debris raining down in its aftermath, is something novel in popular science studies as well as in the environmental humanities, a field which has only in recent years begun to venture outside of what one might refer to as the environmentalist cannon.

Finally, and connected to this move beyond straightforwardly green environmentalism, this is a project for the Anthropocene, an age in which the human is not only intricately bound up with its *Umwelt* but influential as never before. The end of this work delves into the connection between the texts I examine here and our historical and geological moment in much more detail. Nevertheless, it is worth saying here that these texts have been selected explicitly because they refuse to pretend that

it is possible to go back to an era that is less human. They are reconciled to the fact that our sheer numbers and technologies necessitate a more nuanced understanding of our relation with that which surrounds, sustains, and sometimes threatens us.

1.3

The Nature/Culture of My Reading

1.3.1. “We,” the human

It bears explaining why I have self-consciously employed the first person plural — the pronouns “we,” “our,” and “us” — despite recognizing that there are real problems in casually assuming commonalities and/or collective culpabilities among actors on the world stage.

The primary reason I have chosen to speak in these collective terms is practical: the texts examined here, by necessity, make frequent reference to the human as species, and often invoke the first-person plural themselves. Discussing them without myself using these pronouns, i.e. referring to “the human” with “they” and “their” has the uncanny effect of positioning myself as an alien observer. I have no desire, and indeed it would be irresponsible, to assume this level of distance from any discussion of the ecological in which we (!), the human, play a substantial part. One may see already here how the practical rationale for this crucial stylistic choice bleeds into the ideological.

In fact, the “pronoun problem,” though it certainly crops up in many academic and pseudo-academic discourses, is of particular significance to ecological discourses. Peter van Wyck identifies what he calls a “‘we’ shift” occurring in the grassroots environmentalism of the 1960s. According to him, the shift constitutes an “attempt to subsume difference at one level by shifting to a broader, more inclusive category.” The problem for

95 Ibid.
him is that any attempt to speak of the “people,” creates a “new and total position.” He writes, “Moving from profits, technology and political ideologies to the level of ‘all people,’ ignores the fact that people are (in varying degrees and combinations) about profits, technology and political ideologies.” For van Wyck, collective pronouns only create fictions of solidarity and actually serve to silence dissent. He refers to them as “a means of establishing the guise of a community — Gaia, the ecosphere, spaceship Earth — that leaves no possible space for difference.” The use of them is, in other words, merely an obstacle to talking about the “real” problems, the more concretely political.

To some extent, I agree with the critique, although I view it as an insufficient reason to abandon the collective form altogether. The “we” form camouflages the forms of power and the technologies so bound up with it — that, in short, which divides. It is important and in fact crucial, to remember that “we” have not all had an equal share in creating the current ecological crisis. I would never claim that the “profits, technology and political ideologies” dividing up the collective ought to be disregarded in favor of an establishing an impossible ecological happy family.

With all of this in mind, a number of ideological reasons still prevent me from abandoning collective pronouns. The first is that, despite being brought on by what we can only call a global elite and subsequently perpetuated by this elite’s own “ideologies, technologies and profits,” our predicament is an authentically collective one. Climate change may not affect all evenly, or even directly, but the distinct possibility that it might have such deleterious consequences for the world’s poor (who have not yet engaged as intensively in activities we consider environmentally damaging), combined with the highly unpredictable second-

96 Ibid.
97 Ibid.
98 Ibid., 25.
ary and tertiary effects that will resonate far from the coasts, should at least be enough to consider it a problem in which we all have a stake. Those touting the benefits of global warming for, just to cite one example, growing peaches in Canada, have, like the rest of us, only the foggiest idea of what effects might accompany the tropical breeze in decidedly non-tropical latitudes.

Secondly, the “we” allows us to consider the human ethologically as its own kind of animal. This is not an assumption of universalism per se, but it does acknowledge that there is something peculiar about the human. If one follows Uexküll, the human is a range of affects, of possibilities unique to the organism. With Agamben, it is merely the recognition of oneself as human, as not animal.\textsuperscript{100} Latour, for his part, describes the human as the “weaver of morphisms”\textsuperscript{101} or the ultimate conjugator. What does in fact distinguish the human need not necessarily be worked out. Invoking the “we” here merely entails that we can talk about \textit{Homo sapiens} as animal and does not necessitate an exhaustive “fleshing out” of precisely how we might understand the human. This work considers the human from a number of angles, but it is enough at the beginning to recognize the simple fact of shared strangeness in this strange animal.

Pointing to this condition of shared animality again and again with collective pronouns, I hope, also directs attention to “an emancipatory politics of bare life.”\textsuperscript{102} Both Thrift and Jameson have connected the expansion of the present to the animal-in-human,\textsuperscript{103} and I wish to continue this project in my analyses. As Thrift so succinctly puts it, “‘bare life’ is not bare. It is most


\textsuperscript{102}Thrift, \textit{Object of Nature}, 48.

\textsuperscript{103}Although Jameson, in contrast to Thrift, insists that “the historical tendency of late capitalism — what we have called the reduction to the present and the reduction to the body — is in any case unrealizable; human beings cannot revert to the immediacy of the animal kingdom (assuming indeed the animals themselves enjoy such phenomenological immediacy).” He does not say why this phenomenological immediacy is denied to the hu-
of what there is.” Although biopolitics that reduce the human to bios are much maligned in critical literature, the potential inherent in bios has been less explored. The “we” may thus be seen as directing the reader away from the endless entanglements of zoē (most notably the social), and toward the very different entanglements of bios.

Finally, I would like to suggest that collective pronouns, rather than referring to “the guise of a community,” as van Wyck would have it, themselves call forth collectives that cannot be said to yet exist. Deleuze, in “Literature and Life,” identifies this as the function of literature itself: “[T]he writer as such is not a patient but rather a physician, the physician of himself and of the world. The world is the set of symptoms whose illness merges with man.” He continues, “Health as literature, as writing, consists in inventing a people who are missing. It is the task of the fabulating function to invent a people.” I make no claims for the world-therapeutic value of this work, but the authors with which it engages are certainly physicians of a sort. Lovelock even advocates a “planetary physiology.” The world consists of more than ecological crisis, surely, but ecological crisis is nothing if not “the set of symptoms whose illness merges with man.” These authors consistently write in the first-person plural, I believe, not because they already maintain the existence of some authentic global community, but because they wish to summon man. See Frederic Jameson, “The End of Temporality,” Critical Inquiry 29, no. 4 (Summer 2003): 695–718, at 717.

104 Thrift, Object of Nature, 35.
105 See also Thrift, Object of Nature, 53.
106 Agamben defines zoē, synonymous in his work with “bare life,” as “the simple fact of living common to all beings (animals, men, or gods).” Bios, on the other hand, is “the form or way of living proper to an individual or group” and understood in most texts as specific to the human. See Homo Sacer: Sovereign Power and Bare Life, trans. Daniel Heller-Roazen (Stanford: Stanford University Press, 1998), 9.
108 Ibid., 4.
one. Far from wishing to dismiss this summons, I view my taking up of these pronouns as a kind of forwarding action.

The invocation, and, hopefully sooner than later, the building of such collectives is especially necessary if we are to grapple with the enormity of ecological crisis. Bruno Latour describes the collective dilemma especially succinctly: “How could it be ‘us’ who did ‘all this’ since there is no political, no moral, no thinking, no feeling body able to say ‘we’— and no one to proudly say ‘the buck stops here.’”109 This is what drives his call for the “work of assembly”: “Right now there is no path leading from my changing the light bulbs in my home straight to the Earth’s destiny: such a stair has no step; such a ladder has no rung. I would have to jump, and this would be quite a salto mortale!”110 The authors I engage with sought to build the rungs of this ladder, to render this jump less lethal, and these collective pronouns are essential to their effort. Even if the only ones to break the “salto mortale” are those who have read and been persuaded by the same literature, the authors at least promise and hope for some sort of collective with global aspirations. I write in the same hope, although I think we (!) ought to constantly scrutinize what and who is implied in the summoning of a global human collective.

1.3.2. The reparative disposition
It should also be becoming increasingly clear that this work is not one that attempts to unmask and demystify, and, indeed, although the scientist-humanists I focus on could certainly be taken to task for any number of things, I have chosen not to do so. To approach these works, written by three male scientists who believe so strongly in what science can accomplish that it often blinds them to what it does not, with anything but suspicion, may be seen by some as unforgivable, and yet that is precisely what I’ve set out to do. This stance owes as much to Eve Kosofsky Sedgwick’s critique of paranoid reading as it does to

110 Ibid., 7.
the vision of an essentially productive criticism propounded by Bruno Latour.

This is not to say that I do not acknowledge some of the criticisms leveled at the authors (and the individual analyses will touch upon these), but I do not allow that the “hidden historical violences that underlie a secular, universalist liberal humanism” necessitate the dismissal of the texts entirely. There is too much, in any case, in the texts of Wilson, Lovelock, and Sagan that eludes the kinds of metanarratives a paranoid or critical reading would zero in on; these are the traces through which this book attempts to sift. There is always something that escapes, a micropolitical dimension that may emerge if one only attends to it.

I would like to maintain, moreover, that, particularly in the ecological humanities, attempting to approach texts in the reparative mode is essential in order to begin to depart from the catastrophism that is only reinforced by readings that are merely paranoid. If one wishes to emerge from a crisis, in short, not every form of expression can be seen as of that crisis. Perhaps the question is not the one that I followed Bennett in posing at the beginning, “How can someone write a book about enchantment in such a world?” but rather, why is it that attending to enchantment is seen by a great many scholars as “so sappy, aestheticizing, defensive, anti-intellectual, or reactionary”? This work does not necessarily position me to answer that question, but it does join Kosofsky Sedgwick in saying that there is nothing “mere” about “pleasure and amelioration.” Ethics, as Bennett insists at the beginning, is as much a matter of rules, perhaps arising from

113 Sedgwick, “Paranoid Reading and Reparative Reading,” 31.
114 Ibid.
negativity, as dispositions, and pleasure and amelioration are part and parcel of this. Kosofsky Sedgwick continues:

No less acute than a paranoid position, no less realistic, no less attached to a project of survival, and neither less nor more delusional or fantasmatic, the reparative reading position undertakes a different range of affects, ambitions, and risks. What we can best learn from such practices are, perhaps, the many ways in which selves and communities succeed in extracting sustenance from the objects of culture—even a culture whose avowed desire has often been not to sustain them.115

That many have extracted and continue to extract sustenance from *Biophilia*, *Gaia*, and *Cosmos* should become abundantly clear in the following chapters, and I insist that, even if some find the brand of sustenance provided distasteful, there is something to be gained from understanding what may draw the reader in to begin with. Here I have attempted to, in line with Latour,116 multiply the possibilities of the text rather than subtract and debunk. Looking at these works as embodiments and enactors of affective wonder, moreover, brings us far closer to understanding the popularity and lasting impact of these texts (and perhaps even to mobilizing their tactics in ecological politics) than paranoid readings ever could.

This first chapter has endeavored to explain the motivations behind a project which, consisting of an examination of popular science books from the 1980s, may sound esoteric, but which is at heart just as much about ecological subjectivity today.

115 Ibid.
Not only do the works in question fly in the face of the catastrophism and the future-talk I argue plagues much of ecological thought, but they gesture toward ways of inhabiting an open, dynamic present, and thus to alternative kinds of ecological engagement. I am not the first to argue that popular science is not merely science popularized, but in fact consists of claims and anecdotes about the intrinsic value of science that also point to the wonder inherent in the world. The next chapter (Chapter 2) will investigate the reenchanting functions of popular science in much more detail. Rather than presenting the reader with inert depictions of life and the life-like, the earth, and the cosmos, the works I discuss can be understood as quasi-vitalist. In the manner in which they insist on the animatedness of material, they fall in much more neatly with more contemporary vital and incorporeal materialist frameworks, which I will also go on to examine. Chapter 2 also explores and explicitly defines affective wonder, outlining, finally, how a reading that seeks to examine how the texts embody and transmit this wonder might proceed.

The other function of this chapter was to begin to outline the work’s own stylistic and critical (or rather reparative) dispositions. These dispositions have crucially informed the analyses of the texts appearing in the chapters on Biophilia (3), Gaia (4), and Cosmos (5). What one encounters in these works are a series of attempts to confront the reader with novel affects, with wonder, operating, as a rule, on increasingly larger scales. Biophilia, Gaia, and Cosmos here are not merely the titles of the works that form the core of my corpus but are themselves explored as concepts central to the affective ecologies woven by their respective authors. “Biophilia: Affiliation and the Infinite Unseen” begins small but explodes the very idea of smallness. Here, with Wilson, a mere handful of dirt, in its inexhaustibility, constitutes a source of wonder. As we will see, Wilson constantly employs technologies (even if they are merely literary) of scale that put a new cast on the mundane and our relation to it. What this amounts to in the end is, perhaps, the most anthropocentric conservation ethic of them all: We must conserve in order to preserve the infinity of the reservoir of affects that nurture
the human. “Gaia: The Affects of the Earth” presents not only a larger vision of the living earth rather than individual ecosystems but also one which is far more indifferent to the human. By way of the 1985 BBC mini-series Edge of Darkness, which features of a group of scientist-activist who call themselves Gaians, the chapter focuses on the manner in which the very concept of Gaia radically reenchants and draws us into the planetary present. Finally, with “Cosmos: ‘The Subtle Machinery of Awe,’” we turn to Sagan’s massively successful book and series. The declaration that we are star-stuff, far from being merely a statement about the distant origins of matter, also insists that we share something with the extraterrestrial and, indeed, feel with it. Although Cosmos shares a great deal with Gaia and Biophilia in celebrating the infinity and excess of life on Earth, it is also fundamentally about the potential for reenchantment in an age in which we are just beginning to realize the vastness of that which we have not yet experienced in the universe.

The final chapter, “The Poet-in-Scientist in the Anthropocene,” begins by looking back at the analyses of Biophilia, Gaia, and Cosmos. Pitting the larger claims they make about reenchantment and the place of the human against one another, the chapter reveals that, although they share a great deal in their general orientation towards reenchantment and the place of the affective in science, they diverge in important ways. Here, as well, the figure of the poet-in-scientist is brought into the present, and specifically into what we will discuss as the Anthropocene. It ends by asking how the role of the poet-in-scientist has changed in an era in which everything has become at least a little bit human: What becomes of wonder when our day-to-day activities have, less than overnight in geological time, rendered former affective treasure troves so familiar?