

## Wonder in an Uncertain World: A Necessary Habit for Building Care for Nature

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### Abstract:

This article explores analytically different senses and usages of the concept of wonder, in order to analyze which of them are more fruitful for fostering care for nature, especially when it tends to avoid scientific reductionism or fundamentalist understandings of religions. Wonder that is understood as openness to mystery and uncertainty is particularly positive precisely because it moves us away from the aforementioned dangers. In this sense, wonder as awe seems to be the most positive sense of wonder. Inasmuch wonder questions our way of doing things and/or our preconceptions it may be a useful resource to embrace for environmentally friendly habits. The article compares this sense of wonder that Rachel Carson developed in order to question our dominion of nature and tendency to control it, with Pope Francis' claim that paying attention to reality rather than to our deformed visions of nature is necessary to foster care for the environment rather than destroying it. In conclusion the article argues that wonder is a powerful resource, for believers and non-believers alike, to build a better relationship with the environment in order to preserve it.

**Keywords:** Wonder, Anthropocene, Rachel Carson, Laudato Si'

*La maravilla en un mundo incierto: un hábito necesario para cuidar la naturaleza*

### Resumen:

El artículo explora primeramente los diferentes usos y sentidos de la palabra maravilla (wonder) para buscar aquellos que son más útiles para favorecer el cuidado de la naturaleza, especialmente cuando ayudan a evitar el reduccionismo científico o las comprensiones fundamentalistas de la religión. La maravilla que se entiende primariamente como apertura al misterio y a la incerteza es particularmente positiva puesto que nos ayuda a prevenir los peligros apenas mencionados. En este sentido, la maravilla como asombro o estupor parece ser el sentido más positivo de la maravilla. En cuanto la maravilla cuestiona nuestras prácticas y prejuicios antes la realidad puede ser un recurso útil para desarrollar prácticas amigables con el ambiente. El artículo compara este sentido de la maravilla desarrollado por Rachel Carson para cuestionar las pretensiones de dominio y control ante la naturaleza, con la apertura a la realidad que propone el Papa Francisco como necesaria para cuidar el ambiente, en vez de seguir nuestras visiones deformadas de la naturaleza que llevan a destruirla. El artículo concluye argumentando a favor de que la maravilla es un poderoso recurso, tanto para creyentes como para no-creyentes, para desarrollar una mejor relación con el ambiente en orden a preservarlo.

**Palabras clave:** Maravilla, Antropoceno, Rachel Carson, Laudato Si'

Wonder is generally thought to be a good thing. We cultivate it in young children and commend it in our greatest scientists. Curiosity and awe, each representing distinct facets of wonder, inspire public enthusiasm for

science and are central to the advancement of knowledge. Yet for all the praise they garner, wonder and awe—and other moods and motivations associated with these states—have long been met with vocal detractors.

Theologians have sometimes taken a jaundiced view of wonder that edges close to curiosity, condemning its tendency to trespass into idle or forbidden knowledge. Augustine (354-430) propounded a moral critique of curiosity that dominated European thought for several centuries (Griffiths 2006). On this account, curiosity often manifests as a vainglorious vice that puffs one up with pride bordering on self-deification (Daston and Park 2001). Curiosity was a perversion of the intellectual appetite owing to its acquisitive, grasping impulse. While it reliably returns new knowledge, curiosity's reach always exceeds its possessive grasp, consigning the wonderer to eternal dissatisfaction. Its quest for knowledge is both closed-off and potentially infinite—narrowly circumscribed by its fixation on a given object, yet interminable because its appetite cannot be sated. For Augustine, prideful curiosity stood in the way of a virtuous and more open-ended inquiry into all things, including the relationship of all things to God. In short, curiosity could distract the wonderer from God, while seeming to make a god of the all-knowing self.

Philosophers have expressed ambivalence toward wonder as well. The 16<sup>th</sup>–17<sup>th</sup> century English philosopher Francis Bacon famously disparaged wonder as a form of broken knowledge, “nothing else but contemplation broken off, or losing itself” (Spedding, Ellis, and Heath 1859: 223). Rather than convey the wonderer toward explanation, excessive wonder, he believed, could engender stupefaction, prolonging instead of curing the conditions of ignorance that give rise to inquiry. Concerns about the soporific quality of wonder—its power to induce open-mouthed astonishment—hint at a certain quality of awe that sometimes infuses wonder. If curiosity at times is faulted for its narrow, blinkered pursuit of solutions to puzzles, an excess of wonder can stall the mind, leading inquiry nowhere at all (the etymology of the word astonishment reveals its connections a stone-like state of paralysis). Awestruck, gaping wonder might be admissible, Bacon believed, when contemplating the unparalleled greatness of God, whose mysteries science can never fully fathom. But it was at best unbecoming, and at worst a serious liability, for the scientist seeking knowledge.

These misgivings go against a widespread and commonsense perception that wonder has a positive role to play in the realm of science and in the daily lives of regular people, religious or otherwise. Today, when

wonder is enjoying a renaissance of sorts, the term is often invoked as if its meaning were self-evident, or self-evidently good.

But in order to gauge its value, we must get clearer on what wonder is, and for whom or what it might be good. This is no simple task, for our inherited notions of wonder have been shaped by centuries of theological and scientific debate about licit and illicit forms of knowledge, and how we understand the division of labor between science and religion. Moreover, “wonder” connotes vastly different things to different people. The excited state of wonder “ranges from the sudden and intense to the gradual and moderate, until it shades into ordinary emotion” (Parsons 1969: 85-86). As indicated by frequent references to small children and professional scientists as the purported standard-bearers of wonder, its key characteristics run the gamut from experiences of spontaneous, innocent delight to highly trained, disciplined habits of thought. Adding to wonder’s complexity, as we have already seen, is its entanglement with cognate terms like curiosity and awe.

With wonder’s complexity and ambiguity in mind, I want to consider what features might make wonder commendable, if indeed it is. What types of wonder ought we to cultivate and why? And how does a commendable form of wonder align, or perhaps clash, with scientific knowledge, on the one hand, and with religious and spiritual sensibilities, on the other?

In particular, I see much that is valuable in a certain open-ended expression of wonder that remains resistant to cognitive closure, a species of wonder that does not set in motion a retreat to the security of absolute trust in science or blind fealty to dogmatic religion. In seeking a form of wonder that honors mystery, ambiguity, and uncertainty, I draw particular inspiration from the work of environmental pioneer Rachel Carson and the writings of Pope Francis.

### **Wonder’s Resurgence**

Wonder, as I have suggested, is having a moment just now. It is not entirely clear why this resurgence is occurring, but perhaps wonder’s appeal is a function of a general weariness and disenchantment with all-pervading technology in our lives, or the seeming endlessness of the Covid-19 pandemic, and the sense of disconnection it intensified. Although the recent surge of interest in wonder and awe precedes the pandemic, this event, particularly at its peak during shut-downs and

ensuing social isolation, may have helped cast a spotlight on wonder. For, as Covid slowed the pace of life, many people who found themselves confined to home and to restricted routines began attending more to everyday enchantments like backyard birdwatching, nature walks, gardening, baking, or other humble handicrafts (Bauman, 2021).

Whatever the reasons for renewed attention to wonder, the term as it is popularly understood and celebrated today seems to have shed many of its theological trappings, as it has come to be seen as a secular mood or disposition, or a source of therapeutic well-being. But an aura of something spiritual envelopes it still. Entire research programs have recently sprung up around wonder and awe, as investigators seek to understand when and how people experience these states, and what the consequences may be, individually and for society (Allen, 2018).

It is important to note that in the context of such studies, many researchers today regard *awe* as the key term of interest and empirical investigation, around which orbits a cluster of related responses we call wonder or curiosity. My own view is slightly different. Wonder, as I understand it, is the overarching category, shading into childlike amazement at one end of the spectrum, and exhibiting reverent, perhaps even terrifying awe, at its other extreme. At the fear-and-trembling end of the spectrum wonder has been heralded as something bordering on trauma, a “cognitive crucifixion” (Keen, 1973, p. 30). If that sounds extreme, consider that the word wonder has roots in *Wunde*, suggesting its wounding effect, an injurious potential to create a “breach in the membrane of awareness, a sudden opening in a man’s system of established and expected meanings, a blow as if one were struck or stunned” (Parsons, 1969, p. 85).

But wonder need not wreak such psychological havoc for it to have moral value and lasting impact. Wonder that remains open to mystery and uncertainty—without necessarily shutting down knowledge acquisition and explanation—captures what is good about wonder. It is this species of wonder, I would argue, that is worthy of admiration and cultivation, in people of all ages. Such wonder can exert the destabilizing power of awe, without the total, mind-numbing paralysis or fearful retreat that have troubled certain critics like Bacon. In staking this claim to a moderated form of awe-tinged wonder, I am essentially affirming elements of the Augustinian critique of curiosity’s narrow preoccupation with its immediate objects, though without necessarily assenting to some of Augustine’s harshest assessments of curiosity (Griffiths, 2006). Curiosity,

after all, has its place. To its credit, for example, curiosity gives wonder a jolt of focused energy that guides inquiry toward explanation. But knowledge guided solely by curiosity is like a dog endlessly chasing its own tail, unable to stop and evaluate its single-minded pursuit and the potential impacts of such pursuits—sometimes dangerous or even deadly—on the wider world, notably in the realm of wonder-inducing technologies (Sideris, 2015). Left to its own devices, curiosity is liable to devolve into what I call serial wonder (Sideris, 2017). Serial wonder is wonder’s counterfeit form which moves impatiently from one object to the next, never dwelling for long once the mystery is replaced with secure knowledge, and the world resumes its familiar shape.

If awe is the facet of wonder that helps to hold the door open to mystery or uncertainty, how is this feat accomplished? And how does awe contribute to the goodness of wonder, if indeed it does?

### **Awe-tinged Wonder**

Awe erupts in the presence of phenomena experienced as powerfully vast, overwhelming or incomprehensible. As such, it frequently sets in motion a process of adjustment, an *accommodation* of one’s mental apparatus to the experience or entity that elicited the awed response (Keltner and Haidt 2003). Accommodation can be difficult, even painful. But an expanding body of literature suggest that when the process occurs, the result is not simply a return to the status quo but a fundamental shift, sometimes dramatic, in one’s perspective. In the experience of awe-filled wonder, the wonderer is pushed beyond her comfort zone; something in oneself must undergo change in response. The world cannot simply be made to fit back into the old box, or domesticated back into its everyday-ness.

This movement of the self to accommodate the experience of wonder has important ethical implications. There is a case to be made, for example, that many of our current and most intractable environmental problems are caused and perpetuated by our refusal to align ourselves with the workings of natural systems and the lifeways of other organisms, and our penchant for modifying—and simplifying—those systems to suit our own preferences. We can see how proposed solutions to human-caused environmental issues like climate change often continue the same habits of thought and behavior that caused the problems in the first place: engineering the climate, rather than changing our own patterns of extraction, emissions, and consumption, for example (Kolbert 2021). By

manipulating the world around us, we can maintain the desired status quo (why limit our carbon emissions if we can create technologies that will manage the climate impacts?). Or consider the intentional introduction of a novel organism into an ecosystem to control other organisms whose population has exploded due to human tampering (intentional or otherwise). These interventions often generate the need for additional fixes, in an iterative fashion, while we fail to learn the lessons of the past. Some of humanity's most destructive interactions with the natural world seem to follow a pattern of attempting to change the world to fit our preferences or to suit our need for comfort and convenience in the short term.

Accommodation to wonder-inducing input entails that something in *us* much change in response to something in the world that defies our expectations or ability to master it, cognitively or otherwise. In this process of adjusting ourselves may lie the roots of ethical dispositions that are often understood to cluster around wonder: empathy, humility, reverence, an attitude of gentleness, expressed as the “concern not to blunder into damaging manipulation of another” (Hepburn 1984: 146). Wonder, in its most commendable form, may provide the push toward understanding ourselves to be a small part of natural processes that can surprise us with their power, mystery, and complexity, and that demand from us the concession that we do not understand and cannot fully control these forces. Wonder is decentering in salutary, if sometimes discomfiting or distressing, ways.

Of course, wonder framed in these terms, as the demand for a concession on our part to something powerful, or a process that punctures the over-inflated ego, might sound more punitive than inviting. Yet the positive ethical potential of awe-tinged wonder is related to its power to unsettle the wonderer. Research on wonder and awe seeks to understand the phenomenon of accommodation to the source of wonder and its potentially significant—and ethical—effects. Some investigators have pinpointed a distinction between short-term, experimentally-induced awe (using immersive videos or images of landscapes or other prompts) and “dispositional” awe experienced by people in whom wonder has become a habitual mode of engagement with the world. Experimentally induced awe is often accompanied by a “negative, aversive feeling of powerlessness” (Gottlieb et al. 2017: 2). The perceived sense of powerlessness may set in motion defensive responses, as if triggering a need to shore up one's sense of control. More specifically, in some studies, short-term awe is found to *lower* tolerance for ambiguity and uncertainty

(Gottlieb et al. 2017). Here awe's destabilizing impact provokes "compensatory" mechanisms that can activate a retreat to certainty. For these individuals, compensation can lead them to seek the relative security of religion or scientism (defined as inordinate faith in science, or the belief that science is the only way of understanding the world). The certainty of religion or scientism restores a sense of normality and control that an ephemeral experience of awe has temporarily disrupted. The result is fortification or entrenchment—a kind of digging in of one's heels or doubling down on secure knowledge or belief. A refusal, in other words, to change.

Note, parenthetically, that withdrawal from ambiguity, discomfort, or mystery is a potential feature of *both* curiosity *and* short-lived, disruptive awe. Each in its own way entails a sense of unease with what it does not readily comprehend, a need to make what is disconcertingly strange appear familiar again. Curiosity sets in motion a desire to *solve* the puzzle, in order to dispel mystery and uncertainty. Curiosity's puzzle-solving nature, as noted before (and as Augustine believed), can have an addictive quality, stimulating "an appetite for nothing other than the ownership of new knowledge" (Griffiths 2006: 50). Indulging it only leads to greater unhappiness, Augustine believed. Like the disruptive awe experienced by non-habitual wonderers, curiosity can engender distaste for that which is not readily explicable. Puzzle-solving shields the curious from the possibility (distressing to some) that mystery is an abiding, ineradicable feature of the world.

Returning to studies of dispositional wonderers: How is wonder experienced by those for whom the state of wonder is an *engrained* orientation on the world—those for whom a retreat to security and certainty does not set the terms of the wondering response? Some research indicates that individuals who report regularly experiencing awe and wonder exhibit greater tolerance for ambiguity and uncertainty. Dispositional awe, moreover, is associated with an increased understanding of the nature of science—that is, science understood as an activity that is both provisional and reliable, distinct from *scientism* or "faith" in science (Gottlieb et al. 2017). Moreover, dispositional awe "predicts a decreased reliance on scientifically unwarranted teleological explanations" including false explanations of the natural world like creationism that assume a purposeful design or end goal for the natural world (Gottlieb et al. 2017: 2). These findings appear to suggest that, contrary to Bacon's concerns about wonder as broken knowledge, an abiding and durable sense of wonder can be fully consistent with the

pursuit of knowledge. Indeed, the very open-endedness of dispositional awe, its capacity to resist cognitive closure—while steering clear of the other extreme of cognitive crucifixion—makes it congenial to scientific practice. Good scientific practice, marked by an ability to accommodate novel findings, and to revise or reject old beliefs, works in tandem with the openness of dispositional awe. A disinclination to rely on overtly teleological explanations similarly coheres with a state of open-ended inquiry that does not seek final or absolute answers to questions of meaning and purpose, but dwells in ambiguity.

### **Enduring Wonder**

The dynamics entailed in a dispositional awe-tinged form of wonder bring us to a consideration of environmental pioneer and nature writer Rachel Carson. Dispositional awe, as some researchers have described it, resembles an account of wonder proposed by Carson in the 1950s and 60s. Trained as a marine biologist, Carson's first three books were all about the sea and sea life. Carson is best known for *Silent Spring*, an extended science-based, moral critique of the indiscriminate use of pesticides like DDT. In a follow-up book titled *The Sense of Wonder*, published after Carson's untimely death from cancer, she lays out some of the features and benefits of wonder. Although the book is intended largely as an aid to parents and other adults wishing to introduce children to the enchantments of nature, *The Sense of Wonder*, together with scattered references to wonder throughout Carson's essays and personal correspondence, and her extensive writing on the sea, has much to teach us about wonder for people of all ages.

*The Sense of Wonder* proclaims the possibility of wonder's "lifelong durability," a way of being in the world that is available not just to scientists but to all who are willing to place themselves "under the influence of earth, sea and sky and their amazing life" (Carson 1965: 45). In such moments, nature exercises its authority over the wonderer who conforms herself to the source of wonder and the truths it contains. In writings elsewhere, Carson argued that wonder as an engrained disposition provides a powerful antidote to destructive impulses to master and control the world and other beings around us. In short, the more indestructible wonder is, the less destructive we are likely to be.

The ability to dwell with mystery, Carson believed, is good not only for nature but for us; wonder can be a significant source of strength and



resilience in times of turmoil, uncertainty, and the sheer boredom, alienation, and disenchantment of day-to-day life. These features of wonder—especially, its benefits for the wonderer—have been highlighted, and perhaps even overemphasized, by contemporary treatments of wonder that celebrate it in largely instrumental terms (see for example Reese 2023). Wonder is promoted as a source of health, happiness and success in popular writings, in ways that threaten to eclipse wonder's ethical value for something beyond the human realm or the individual, striving self. I will return to this issue shortly, but for now it is important to note that Carson treated wonder as a full-fledged worldview, an orientation on reality, not merely a fleeting experience or a boon to one's psychological well-being. This orientation on the world, which we will see is shared by Carson and Pope Francis, understands reality as permeated with mysteries that are beyond our ken as human beings. For Carson, to posit mystery in such terms was not a flight from science or facts; rather, the more we know about the real world around us, the more we apprehend its mystery. Carson's claims for the capacity of enduring wonder to lessen our demand for certainty and control in our dealings with the wider world find support in some lines of contemporary research on wonder and awe. What these researchers label dispositional awe is what I consider genuine wonder, or wonder at its best.

Before exploring more fully the details of Carson's treatment of wonder, mystery, and reality, it is instructive to consider some widespread but, I believe, problematic accounts of wonder with which her account—and certain features of dispositional wonder—contrasts in important ways.

### **Competing Accounts of Wonder and Reality**

A zealous advocacy of a certain style of wonder has taken hold within a large segment of scholarship in the field of study known as religion and ecology, an area of study that arose in the wake of critiques of religion, and particularly the so-called Judeo-Christian worldview, as being anti-environmental (White 1967).

My own work has offered a steady critique not of religion per se but of a particular mode of modern myth-making, and its dubious forms of wonder, that I call the new cosmology (Sideris 2017). Prominent advocates of cosmological mythmaking draw inspiration from the "geologist" Thomas Berry and the Jesuit priest and paleontologist Pierre Teilhard de

Chardin. The field of religion and ecology as a whole has been significantly shaped by efforts that these prominent thinkers inspired to tell a new story, a narrative purportedly faithful to science and responsive to our contemporary environmental crisis. These storytellers—Teilhard, Berry, and scholars of religion and ecology who followed their lead—aim to place humans into deep-time cosmic history, stretching back nearly 14 billion years to the birth of our universe in the Big Bang. Humans are understood in this story as the part of the universe that has become conscious of itself. A new story is needed, the argument typically goes, because “we” lack a shared story, a functional cosmology, a serviceable myth, that will orient us toward what is real and important in *this* world (Berry 2003; Rue 1989). The stories we have inherited from traditional faiths no longer appear plausible in light of modern science and our global crisis, these critics argue. Some advocates of a new story draw less from Big Bang cosmology than from an evolutionary paradigm that is seen to provide a coherent framework for understanding everything we need to know about human origins, destiny, and purpose. For these thinkers, sociobiology and evolutionary psychology are key to the creation of a new myth—we are understood to be hardwired by evolution to require the coherent narrative that the evolutionary account makes possible (Rue 1989). The evolutionary epic, in other words, is both prescriptive and descriptive: it is proffered as a true and accurate myth that happens to be the one we need right now.

Why do “we” need this myth, one might ask? The answer leads us back to wonder. Aside from claims about the lack of coherence in existing religious narratives—all those competing and contradictory origin stories—we require a new cosmology that will restore a sense of wonder at the universe and our place within it. Self-styled evolutionary evangelist and universe storytellers hail this new myth as the basis for a new kind of religion, a religion of reality that can potentially outcompete all the contending, maladaptive myths—stories with one foot in the old world, or, more aptly, in the old universe that placed humans firmly at its center.

A distinctive celebration of science-based wonder and a sharp suspicion of mystery runs through the new cosmology, in all its forms, I believe (though some are more wary of mystery than others). The basic idea is that cutting-edge science about human and cosmic origins and evolution, if narrated with the cadence and rhetorical power of myth—will fulfill many of the functions of religion. The wonder enshrined in this new narrative is seen to be more real than that of competing myths. The goal of evoking wonder is to orient humans toward a more caring and

connected relationship with the natural world. Wonder at understanding where humans fit into this grand cosmic drama, it is hoped, will guide us toward the necessary ethical engagement.

And yet the wonder generated in these myths often seems reserved for science, scientists, and the scientific narrative itself, first and foremost, and for nature only secondarily, if at all. Facts about the universe, in other words, are seen to generate a meaningful account of who we are. This move from science to story is understood to be virtually seamless because the universe itself is *storied*. The universe is an unfolding phenomenon that embeds within itself certain principles of interconnection, interrelationality, and impulses toward communion and bonding (Kennard and Northcutt, 2011). In an echo of the cosmic philosophy of Teilhard de Chardin, humans are positioned in universe story narratives as something akin to the cosmic apex in this story, the most complex expression of the universe's innate tendency to evolve ever-higher forms of consciousness. The term most appropriate to this cosmic philosophy is *anthropocosmism*, the view that humans are not just another part of the chain of being but possess a particular kind of uniqueness reflected in the capacity of the human mind to mirror or embody the whole cosmos. The human role is that of completing the cosmos (Tucker 2016). For Teilhard and his followers, completing the cosmos means that humans are destined—from the universe's inception in the Big Bang—to direct the present and future unfolding of the cosmos. We are purposive agents of cosmic meaning.

Note the way in which this story, in its deference to science (and specifically to modern science as superseding older accounts of what it means to be human) reaches toward scientism in its pursuit of universal and objective truths about who “we” are and what it all means. As I have already suggested, this impulse toward certainty—in science or religion, or the two combined—is inimical to the spirit of wonder. The new cosmology combines science and religion into a single coherent worldview, an authoritative source of meaning, applicable to all. In its debt to Teilhard, whose writings enshrined cosmic teleology in the form of an anthropic universe evolving toward fulfilment in highly conscious lifeforms, the storyline, moreover, reaffirms the centrality of humans and humanlike forms of consciousness. We humans are the microcosm of the macrocosm, both center and telos of the universe.

This cosmology would seem to lend itself to many of the claims, beliefs, and dispositions with which habitual awe (what I consider genuine

and commendable awe) stands in tension: certainty of knowledge, investment in teleology, and the preservation of a stable sense of our own importance. Confronted with the possible insignificance of humans in the vastness of the universe, the new cosmology seems to reassert the centrality of humans, in ways reminiscent of the compensatory mechanisms that accompany a failure to accommodate awesome encounters. The story of the universe betrays its authors' discomfort with cosmic ambiguity.

A question, then, presents itself. If *non*-dispositional, disruptive forms of wonder can engender a retreat to secure or dogmatic positions in both science and religion—what we might call scientism in the former, and something like authoritarian or fundamentalist religion in the latter—can a case be made for the compatibility of dispositional wonder with a different sort of religious sensibility? What might this wondering form of religion look like? Is it something that would have to be created from the ground up, so to speak, as Universe Story enthusiasts believe? Are there no existing religions that express a science-informed, nonanthropocentric, open-ended wonder?

Religion scholar Bron Taylor has argued that there are not. Like advocates of the Universe Story, he proposes that a new religion rooted in science, which he calls dark green religion or a terrapolitan Earth religion, is our best option (Taylor 2010). While some proponents of the Universe Story believe that, with a bit of rehabilitation and reinterpretation, the existing world religions can somehow mesh with or plug into the overarching story of the Universe, Taylor remains skeptical, arguing that the existing world religions, and especially Christianity, are likely too inflexible, too maladaptive, to align themselves with, or generate from their core teachings, a robust set of “green” values and practices. Taylor suggests that we “simply let go” of these old belief systems, with their imaginary, invisible beings. These are religions for which “there is no evidence and many reasons to doubt” (Taylor 2010: 221). Simply letting go of them might allow us to “ground our future philosophies, whether or not we call them religious, in what we can confidently say is the real world” (Taylor 2010: 221). Even while Taylor enthusiastically affirms that the universe retains a mysterious and even miraculous quality that science does not exhaust, this emphasis on what is most real, and the power of science to deliver it, acts as a litmus test that restricts how wonder is expressed. Experiences of wonder not firmly and demonstrably grounded in “post-Darwinian” science look suspect, on this account.

## Reality is a Mystery

I am particularly interested in these debates about what constitutes reality and the real world. Claims to what is real often seem aimed at discrediting and discarding competing religions, and attendant forms of wonder, that are seen to be lacking sufficient “realness.” It seems to me that my own appraisals of science and religion often do not fall into the available, competing camps, insofar as I have no particular desire to discredit the environmental bona fides of the existing so-called world religions, but neither do I wish to champion or act as apologist for a particular religion (“world” or otherwise). For the most part, I have tried to communicate across two overlapping registers—sometimes theological and sometimes more naturalistic, but with a consistent emphasis on the need to decenter humans and censure human arrogance.

An example of these two different registers, theological and naturalistic, can be seen in a comparison of the writings of Pope Francis and Rachel Carson, respectively, whose messages about wonder and mystery are remarkably consonant, despite their recourse to different language. Both of these thinkers, I believe, get at something basically right about the trifecta of mystery, wonder, and reality.

Let us return again to Carson and an overview of her discussion of these key terms and categories. For Carson, as I have suggested, proper introduction to nature begins with grasping the fundamental reality that humans are but a small part of the natural world and natural history. Her attraction to the oceans and marine life had much to do with the power of the sea to evoke a humble sense of our own relative insignificance and our evolutionarily ancient, watery beginnings. Her best-selling book *The Sea Around Us* describes the origins of the oceans and its life with frequent allusions to shadowy beginnings and a primordial formless void. Her prose there mimics the style and cadence of the Genesis creation story, even while it is pieced together from the cutting-edge science of her day. Her opening words convey a sense of caution and reverence for the unknown and unknowable. “Beginnings are apt to be shadowy,” she reminds us. “No man was there to witness this cosmic birth” (Carson 1961: 3).

At first glance, it might seem that Carson is doing something quite similar to universe storytellers, namely, casting the scientific narrative of life’s origins in mythic and poetic form. But Carson’s abiding sense of all that we do *not* know is continuously foregrounded, setting a distinctly

positive tone for her sea writing. For Carson, reality is overlaid with and inseparable from mystery. “The mysteries of living things, and the birth and death of continents and seas,” she writes, “are among the greatest realities” (Carson 1998: 96). A mystery is something we can come to *know*, although all claims to knowing must be carefully qualified. Wondering at mystery is akin to knowledge, not merely a sign of ignorance. Carson evokes a reality that is best apprehended not through facts alone but as an experience of enchantment and mystery, a sense of wonder or reverence that is more real than facts. Standing at the edge of the sea, we encounter truths that are not simply the truths of science but convey some sense of the secret, the mystery of life itself. Carson’s reverence before the mystery of “cosmic birth” contrasts with the confident and almost boastful tone of a universe story that heralds its own arrival as a discovery so “comprehensive ... that it challenges our understanding of who we are and what our role might be in the universe.” The present generation, the story boldly insists, “is the first generation to learn the comprehensive scientific dimensions of the universe story .... And this changes everything” (Swimme and Tucker 2011: 1-5).

Carson, by contrast, insists that despite all our modern instruments for probing and sampling the ocean, we will never resolve the “last, the ultimate mysteries of the sea” (Carson 1961: 212). Like other scientists, Carson feels excitement at the thought of new discoveries and the solving of scientific puzzles. But she often casts doubt on the idea that final mysteries will be dispelled and that scientists can comprehensively explain and narrate all that we and they wonder about. “I cherish a very unscientific hope that they will not,” she confesses (Carson 1990: 80). Modern research on awe and wonder would suggest that Carson’s confession of openness to mystery and uncertainty is not in fact “unscientific” but quite compatible with healthy functioning of the scientific process, distinct from scientism.

A close association of reality with mystery pervades much of Carson’s work. Readers frequently encounter her conviction that mystery continually outstrips scientific knowledge: Carson writes of a certain “elusiveness of meaning” that “haunts us, that sends us back again and again into the natural world where the key to the riddle is hidden” (Carson 1961: 7). Wonder in Carson’s writing is associated far more with ultimate *meaning* than with current knowledge. It is that elusiveness of meaning, combined with what Carson understands as the inescapable reality of mystery, that enhances and perpetuates the sense of wonder.

## The Reality of Wonder for Pope Francis

As with Carson's writing, Pope Francis places repeated emphasis on reality, a word that, on my count, appears over forty times in his encyclical *Laudato Si'*. Like Carson too, Francis defines reality apophatically, by delineating what it is *not*. First and foremost, reality, for him and Carson, stands in opposition to anthropocentric modes of being. Francis proceeds in this somewhat indirect fashion, defining reality by negation of distorted forms of reality that humans construct and stubbornly struggle to maintain. Anthropocentrism—defined by Francis as a condition in which humans “no longer recognize any higher instance than ourselves, when we see nothing but ourselves”—is the most pronounced outward symptom of false reality (§6). He echoes Carson in advancing the idea that reality has a fundamentally mysterious quality, though he is careful not to align this mysterious, sacred reality wholly with nature. That is, reality for Francis is not simply synonymous with nature or natural systems, but these systems function as a tangible sign, an intimation of a greater reality that includes but also *exceeds* nature itself.

Human efforts to “transform reality” in ways that ignore our fundamental, relational anthropology give rise to a whole host of environmental and societal ills, he believes. Tyrannical anthropocentrism instrumentalizes human and nonhuman others and perpetuates a narrowed, technocratic vision. Francis suggests this integral character of reality by pointing to harmful practices—both environmental and social—that routinely ignore it. Francis's integral ecology, a holistic approach to understanding the interconnections between economic, social, political, ethical and environmental problems, thus gives us one way of grasping in positive terms what he means by reality (Sideris, 2023b).

As with Carson's critique of techno-science in *Silent Spring*, Francis is concerned with how the techno-scientific worldview actually encourages the transgression of limits. The technocratic paradigm perpetuates a cycle of antagonism between humans and nature, in ways that ultimately harm both. Technology creates and sustains an impression of limitlessness, but also a constant, anxious need to test and affirm our power again and again. This need for security, control, and assurance is inimical to the state of wonder, as we have seen—and particularly to wonder as a dispositional, habitual state, distinct from a fleeting experience of wonder.

Despite the encyclical's deep engagement with climate science and ecology, *Laudato Si'* implies that the language of science cannot, in itself, function as a form of address, a category of *relationality* vis-à-vis nature (or, more aptly, creation). Francis suggests that a scientific or "experimental" method already contains *within itself* "a technique of possession, mastery and transformation." Constraints are regarded merely as a challenge and opportunity, a goad to further innovation and intensification of science's techniques and practices. Echoing Carson's (secular) critique of technological mastery and scientific hubris in *Silent Spring*, the position of *Laudato Si'* is that Christian teaching directly challenges the dominionistic orientation, insofar as the will to mastery springs from denial of the relational character of reality. Technology divorced from ethics and a reverential sense of wonder sees all practices as licit, and virtually nothing as forbidden (§136). Ultimately, we "end up worshipping earthly powers ... usurping the place of God." Francis's concerns here recall earlier philosophers' and theologians' worries about the grasping and insatiable quality of curiosity, and its vain presumption of all-knowingness, that causes fallible humans to believe they are gods.

Francis suggests that one of the means by which humans shut out the interconnected nature of reality and the dynamism of creation is through a delusional commitment to scientism. Scientists who dismiss science's own limits may come to regard its practices and methodology as a self-sufficient paradigm that is applicable to everything. Hence, Francis pits what he means by "reality" against reductionist and specialized modes of perception that encourage fragmentation of a mysterious wholeness. Technology abets specialization, he argues, and makes it "difficult to see the larger picture" (§110). He calls for dialogue among different disciplines "since each can tend to become enclosed in its own language, while specialization leads to a certain isolation and the absolutization of its own field of knowledge" (§201). Reality stands against absolutization in myriad forms. This perspective is one he shares with Carson. Indeed, it is almost impossible not to hear in Francis's concerns about disciplinary insularity and the dangers of techno-solutionism the distinct echoes of Carson's indictment of shortsighted specialists, "each of whom sees his own problem and is unaware of or intolerant of the larger frame into which it fits" (Carson 1962: 13).

The absolutizing techno-scientific paradigm asserts itself not just in the reductionist move that ignores larger wholes, but also in a perspective that sees *only* wholes, without differentiation, Francis suggests. He thus



decries a “one-dimensional,” once-size-fits-all mentality that has become part and parcel of Anthropocene diagnoses of “humanity” writ large, as when the case is made that “the human” or “the human species,” in toto, is transforming the planet. This totalizing impulse of science shares with globalization a certain troubling tendency to make us all the same (Sideris, 2023a). Against the Anthropocene rhetoric that treats all humans as an aggregate entity, Francis calls for respecting “various cultural riches of different peoples, their art and poetry, their interior life and spirituality” (§57). Above all, he insists that we make moral distinctions between those who are most responsible for climate change and those who suffer disproportionately from its impacts, yet contribute little to the problem. These are precisely the kinds of ethical distinctions that are all too easily rendered invisible and meaningless in sweeping stories of the universe and “the human” as the collective agent of cosmic or planetary evolution.

Nature, in its own way already an interconnected yet differentiated system, participates a mysterious reality that is divine, Francis believes. But *creation* which is inherently relational and moral, owing to its *givenness*—its status as a gift—finds completion in God. “The universe unfolds in God, who fills it completely. Hence, there is a mystical meaning to be found in a leaf, in a mountain trail, in a dewdrop, in a poor person’s face”. This mystical meaning, seen through the lens of creation as a gift, is also what Francis means by reality. Nature is a system “which can be studied, understood and controlled,” he writes, but creation presents itself as “a gift from the outstretched hand of the Father of all” and as “a reality illuminated by the love which calls us together into universal communion” (§76).” He praises the openness to nature that he discerns in St. Francis of Assisi, seeing in it “a refusal to turn reality into an object simply to be used and controlled.” St. Francis’s openness, he explains, is the openness of “awe and wonder” (§11).

The point of drawing these connections between the writings of Rachel Carson and Pope Francis is not simply to say, look: these two seemingly disparate things are similar! Rather, I believe that their articulations of mystery and wonder provide a compelling example, an important supplement, to what some researchers have come to recognize under the heading of dispositional awe, or the habitual propensity to experience wonder over the course of a lifetime. What might be the practical upshot of this philosophy of awe? What is wonder good for, in the end?

## Wonder in a Climate Changed Future

Much of the current popular interest in awe and wonder takes a disappointingly anthropocentric or utilitarian turn, often dwelling, as I have noted, on the human health benefits, like enhanced longevity and psychological well-being, or on workplace success and satisfaction that comes from cultivating dispositional wonder. In popular writing about the benefits of wonder and awe, one can discern a celebration of these dispositions as entrepreneurial virtues, keys for advancing in your career, getting the most out of your employees, or fostering effective leadership (Beranek 2023). The sometimes crass instrumentalization, even monetizing, of wonder is certainly not what Carson or Pope Francis are endorsing. Still, the instrumentalization of wonder as a means to an end is less objectionable, I would argue, when the ends toward which it aims encompass the good of the natural world itself, or what Francis would call creation. Moreover, even advocates of wonder like Carson who wrote eloquently of nature's intrinsic value, understood its potential to bring positive benefits both to oneself and to nature; like other virtues (if we can consider wonder something like a virtue), wonder might be sought for its own inherent goodness but also for the good it can bring to the wonderer and to the world at which she wonders. Owing to its purported ability to foster feelings of gratitude, empathy, openness, and humility, the cultivation of wonder for the natural world supports cognitive and emotional states that may enable one to value nature for its *own sake*; to value nature as something that confronts us with its "otherness." Long before the influx of empirical studies that have accumulated in recent years, theorists of wonder have argued that a hallmark of wonder is its power to *unself* the wonderer, to chip away at the egotistical need to manipulate, control, and appropriate. All of this is to say that even if wonder is cultivated with particular ends in mind, the moral, affective, and cognitive states it fosters can actually work *against* utilitarian valuing of nature and life (Hepburn 1984). In this sense, we can hope that wonder will not simply become the next corporate buzzword or self-help industry fixation in a culture preoccupied with individual advancement and material prosperity.

Contemporary research on dispositional awe, as we have seen, links it with increased tolerance for ambiguity. One way that this cashes out is in a diminished need for, or attraction to, teleological explanations of the world that offer guarantees of security and prepackaged meaning and purpose. Dispositional wonderers, that is, are less inclined to believe the world is designed for a clear purpose (as assumed in evolution-denying

creationism or intelligent design), and thus more open to evolutionary perspectives that eschew faith in a governing force directing nature, unerringly, toward particular ends (recall the cosmic teleology of the universe story).

These findings may also have real, practical implications for human-environment interactions and beliefs, specifically regarding climate change and climate denial among religious believers. The causes of climate denial are complex and varied, of course, and as some scholars argue, they are a function of political affiliation more than religious commitment *per se*. But a contributing factor to climate denial is the belief among some conservative Christians and evangelicals that climate change contravenes teachings about divine omnipotence and control. God alone, on this account, is in control (Veldman 2021). Only God is powerful enough to change or control the climate, or to intervene to prevent an oncoming cataclysm. Climate denial rooted in unshakeable faith in God's providential oversight of the planet toward purposeful, providential ends can thus be a barrier to climate change acceptance, an example of retreat to compensatory control, certainty and security. Given that dispositional wonder appears to make this retreat less likely, might it therefore also make "belief" in climate change *more* likely?

I will conclude with a few, admittedly speculative, proposals about the importance of wonder for addressing dire environmental issues like climate change. Some researchers believe that the predisposition to experience awe and wonder lends itself to understanding nature as comprised of complex systems; systems thinking, in turn, goes hand-in-hand with understanding the planetary mechanisms and feedback loops of climate change. Wonder can produce a paradigm shift from linear, cause-and-effect thinking that perceives the world as comprised of discrete, separate objects, to an appreciation of the vast, complex, dynamic, relational character of reality. "Our social, natural, physical, and cultural worlds are made up of interlocking systems," Keltner argues. "Awe shifts us to a systems view of life" (Keltner, qtd in Jarosz 2023). A systems approach might contribute, moreover, to seeking solutions to climate change that function holistically—eschewing techno-fixes that focus on one part of a system in favor of approaches that derive from holistic natural systems themselves. Rather than building more dams to control flooding, for example, a systems approach would work to restore wetlands, utilizing nature's own processes to control excess water (also creating numerous benefits for wildlife). Systems thinking might help to break the cycle of intervening in nature with short-term fixes that fail to

consider or address underlying causes, including those stemming from human behavior. The relational, systems view of social and natural worlds recalls Pope Francis's endorsement of integral ecology, as well as Carson's critique of the blinkered view of the specialist who, in failing to grasp the bigger, interconnected picture of nature, reaches for short-term solutions like chemical pesticides.

From what we have learned about wonder, we might also speculate that people who are at ease with a natural world whose processes—and wonders—are not wholly orchestrated, ordained, or directed by an omnipotent governing hand are also more likely to confront, rather than deny, the unsettling reality of human-caused climate change. This is not to suggest that only nonbelievers in religion exhibit the tolerance for the open-endedness and ambiguity that makes both genuine wonder and concern about climate change more likely. After all, many religious believers have found ways of combining nonteleological scientific perspectives (as with Darwinian evolution) with religious worldviews, just as there are many who accept the science of climate change, and the unsettling, uncertain future it portends, without eschewing belief in a providential deity. Intelligent people, believers and nonbelievers alike, can work out these details for themselves, as they always have, finding ways to exercise meaningful agency in a world that confronts us with indeterminacy as well as pattern. Whatever else it may achieve, the experience of wonder in nature can lessen immediate feelings of anxiety and depression, empowering us to face environmental challenges with renewed energy, resilience, and hope. As Carson believed, we can draw upon reservoirs of wonder as a source of strength and endurance to keep fighting for a livable planet Earth in the face of daunting but uncertain odds.

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