

Revisiting Creation, Natural Events, and Their Emergent Patterns

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It is fair to say that most scientists today view the laws of physics the way many Dominant theologians view God—as objective, eternal, and unchanging.¹ They hold these laws of nature to exist in some eternal, pure realm, above and beyond the particular manifestations in the lower realm of matter and energy. Physical things conform to these timeless laws, which dictate their behavior and shape their future. This echo of Platonic Forms continues to shape the ideologies and metaphysics of many of today’s scientists and philosophers. This presumption can lead to determinism (with enough data we can know all outcomes), to reductionism (explaining the components explains the totality), and to a dichotomy between law and nature. Its classic expression is found in the musings of Pierre Simon, Marquis de LaPlace, whose thought experiment posits a demon in a closed, Newtonian world. He notes that in such a mechanistic system, once the initial conditions are known and specified, all subsequent states are fixed and known as well:

We ought then to regard the present state of the universe as the effect of its anterior state and as the cause of the one which is to follow. Given for one instant an intelligence which could comprehend all the forces by which nature is animated and the respective situation of the beings who compose it—an intelligence sufficiently vast to submit these data to analysis—it would embrace in the same formula the movements of the greatest bodies of the universe and those of the lightest atom; for it, nothing would be uncertain and the future, as the past, would be present to its eyes.²

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LaPlace shares today's widespread assumptions that eternal laws, coupled with complete initial data, specify all data for all time. Much of today's science assumes a one-on-one correspondence between idealized mathematical operations and natural phenomena, in which the evolution of physical reality is infinitely determined by differential equations that exist objectively and timelessly. Immutable mathematical formulae and relationships are transcendent and ontologically supreme. The laws are absolute and infinitely precise. They determine all particular states of nature but are themselves prior to, independent of, and unconstrained by nature. The laws are beyond space-time (although they determine space-time), and the laws create and shape creation from the moment of the Big Bang until the present, themselves without change. Furthermore, the laws are posited to be a unity, however much that unity continues to evade theoretical expression and experimental verification.³ Eternal law precedes ephemeral creation, ontologically and chronologically.

Eternal, static, objective law (somehow) creates and determines contingent physical reality (this leap across categories is the same weak link in the metaphysics of physics as it is in theology). Reality evolves according to the limits and guidelines of these eternally existing, static laws, and those same laws predetermine nature's future. While the laws determine nature, natural phenomena do not modify the laws. Such a view reflects the theological pedigree of physics in a Dominant theology of a timeless, objective, supernatural spirit whose eternal law shapes and constrains all material creation, indeed, it remains its contemporary expression.

Without rejecting the evocative utility (indeed, the majesty) of this metaphoric portrayal of physical laws, might we not profit here by making explicit its metaphoric nature? Embracing this dualistic perspective as if it were literal and objective perpetuates several counterintuitive defects—predeterminism, reductionism, and a constricted view of what counts as real. Recontextualizing this understanding as the metaphor system it is, we are then free to supplement it with other, more dynamic ways of framing the relationship between generalizable patterns (which, in turn have predictive utility) and specific phenomena (which generate those patterns and also instantiate them).⁴

Instead of positing an ideal (and experimentally impossible) priority of timeless law that then generates and constrains natural

material phenomena, let us assert what we can indeed know: the priority of events in nature. Matter is energy frozen; energy is heated matter. I shall refer to both matter and energy as natural events or processes. We can know these events empirically. Each natural event manifests certain physical constraints, which we know in the measurement or experience of the particular events. As we measure/experience groups or series of natural events, we are able to generalize patterns of behavior or characteristics from the specific details of the events' individual processes. These generalizations are refined through further measurement and through their predictive utility, but they (the "laws") remain secondary and approximate.⁵ Only the events themselves are actual and concrete. The "laws" are composite measurements of these concrete events, expressed as mathematical formulae, generalizations that provide superb intellectual tools for understanding and that generate further research projects in turn.⁶

This reconceptualization of the primacy of natural events that act in patterns, which we label "laws" as shorthand, rejects a Platonic conceptualization of a dualistic reality.⁷ No surprise, then, that the biblical/Rabbinic authorities share our conception: In speaking of the biblical/Rabbinic views of miracles, Louis Jacobs notes that they do not involve a suspension "of natural or universal law (of which there was no such conception in their thinking)."⁸ With this recalibration, the strict dichotomy between law and nature dissolves—law is the idealized generalization of patterns expressed by natural events.

John Wheeler, Rolf Landauer, Paul Davies, and Gregory Chaitin are some of the voices that provide the tools for this Copernican recalibration. Wheeler⁹ and Landauer¹⁰ suggest that the most useful image for conceiving of how matter and patterns relate is to think of information as the beginning of the explanatory narrative of physical reality. Information (what Wheeler calls "bits") is the core data that events (matter and energy) are able to preserve and transmit. Laws emerge from the properties of events, and our perception of these patterns reflects the intersubjective, embodied metaphoric way we conceptualize natural events, explore, describe, organize, and predict them. Our "laws" are neither objective and eternal nor are they subjective and cultural. Instead, our third way, of biologically processing the nature of which we are a part (in which we are embedded, for which we articulate the

consciousness) is the human way of discovering reliable patterns in the behavior and characteristics of natural events. This approach allows us to recognize that natural events (processes) are primary, that what we describe as natural law(s) reflects the patterns and characteristics that natural events manifest individually and in groups. There is thus no ontological gap between laws and events. We are able to recognize that as natural events evolve and develop, the laws can and should develop as well—just as there is no absolute time or space. We can see that the laws co-evolve along with the phenomena that generate them. As natural events (including humanity) continue to self-create and to interrelate, they emerge into novel expressions and developing patterns, at once connected to what came before but able to transcend those constraints. The unity we embody and seek is no longer the mystery of transcending dualism (by comprehending how eternal objective law can impact ephemeral subjective material and why these eternal laws should be fundamentally one), but emerges organically from the dynamic interaction of matter and energy at every moment of evolution, at every level of becoming. There was never any time when natural events were in isolation from each other; there was never any place in which natural events were separated completely. Oneness is itself the expression of emergent, dynamic monism—contemplated and expressed through embodied metaphor.¹¹ And this oneness opens us anew to the marvel of creation—integrating our scientific information and our religious traditions and a unified dance of theopoetic intuition.

Rav Saadia Gaon notes, “There is no means of proving the existence of a Creator other than that of creation.”¹² As have others before and after him, he seeks to know the Creator by reading creation. At least since the philosophy of Immanuel Kant, the pursuit of natural theology has been problematic if not impossible. When Kant demonstrated that we are able to know how the mind organizes reality, but not reality as it is independently, he made an ironclad dichotomy intended to sunder forever the simple link between the works of creation and the Creator. Even reconceived as embodied metaphor, Kant’s insight stands as a warning against a too facile equation of those attributes of nature a theologian would select to impute to a divine source; the possibility for abuse and distortion remains abiding and real. Nonetheless, if we are no longer constrained by a fact/value dichotomy, and if we understand

mind as a process of the universe itself come to consciousness, the laws as the patterns of natural events, then we are no longer seeking to describe a God radically separate from creation and outside space-time. Instead, we are looking for traces of divinity—novelty, relationship, ethics—that permeate creation and become active through our fellow creations and us. In that light, the words of Rav Saadia ring true in a new context: we seek to understand the process that is divine by understanding better the implications of the process that is creation.

Just as facts are already value-laden and values are already steeped in facts, so our consideration of scientific data has articulated values and perspectives to which we can now give more explicit theological consideration. The first of these facts/values is that of evolution and creation, a battle between those who would insist that every detail of material reality was foretold and established in advance and those who see real openness in the process of creation. The battle lines are surprising. For religious fundamentalists, nothing happens in the world without God's prior intention, so real innovation and agency are precluded. For scientific reductionists on the physics side, nothing happens that is not the simple application of each phenomenon's component physics constrained by eternal law (so real innovation and agency are ruled out). Scientific reductionists on the biology side would insist that everything is random, unpredictable, and the expression of an evolutionary process, so that there is randomness without purpose. Our third way beckons between these chastening straits—a cosmos characterized by dynamism, relationship, and openness, a universe in the process of becoming, an open future awaiting the actions determined by our free agency.

The first, and I think, most profound, reality of an evolving, emergent, dynamic creation is that every natural event is related to every other natural event and to all natural events. "God is," as Whitehead reminds, "not to be treated as an exception to all metaphysical principles, invoked to save their collapse. He is their chief exemplification."¹³ Creation theology begins with the insight that it is not God alone who is one. All is one. We are related to each and to all, as is the Creator.

That all is one is both fact and value. The Big Bang produced hydrogen and helium, but it was the first generations of supernovae that exploded the other elements into the dark skies, flinging

the nitrogen, carbon, and other essentials for building life out into the cosmos. Enough of these elements were collected by the swirling dust that became the solar system and the earth, and the earth was just the right distance from the sun, stabilized by its oversized moon, that it was able to maintain sufficient stability for the emergence of an oxygen-dominated atmosphere, for the emergence of water, for a sufficiently narrow temperature range that the water didn't freeze or evaporate, that organic chemicals could bond, could self-organize in increasingly complex and self-replicating patterns, that single-celled life could commence. That simple life partnered with other single cells (the current theory for the existence of mitochondria and nuclei within cells), and those cells could band together cooperatively to create more complex creatures. Cascading out of this *makor chayim* (*fons vitae*, this fountain of life), some emerged and greened our earth, rooting themselves in sea rock, sand, and eventually risking the dirt. Their children spread as lichen, shrub, and tree, spreading as the great forests and jungles that cradled the Earth, rooting into the very earth they transformed by their presence and stretching toward the light, "the mountains and the hills break forth before you into singing, and all the trees of the field clap their hands. Instead of the thorn the cypress tree shall come up, and instead of the nettle shall the myrtle tree come up; and it shall be to the Holy One for a name, for an everlasting sign that shall not be cut off."¹⁴

Other children emerged as the soft simple creatures of the sea, some as the myriad bacteria and the swarming insects whose buzzing communities still sustain and pollinate for us all—their distant cousins' progeny. Some of their children's children became the backboneed fish, some of whose riskier offspring ventured into the swamps and ponds of amphibian aspiration. A few of these frogs and newts boldly dared into drier parts, and their reptile offspring sprouted sturdy legs for walking the land or erupted in plumaged wings to soar on high. Some of their children's children became mighty ponderous dinosaurs, and some others became the tiny mammals that scurried underfoot until the dinosaurs' demise shoved the timid furry ones onto a path of diversification and growth that produced woolly mammoths, saber-toothed tigers, and also dogs, horses, monkeys, and apes. Some few of those apes descended from the trees and stood up for a better view. We humans have been seeking that clearer perspective ever since.

Life cascades—from the stardust and supernovae that gave our heritage, whose elements comprise our blood, our bones, our skin, our brains, whose electricity powers our nerves and our consciousness. All of the cosmos is our mother/father—we are the descendants and the cousins of the galaxies. And we are also the children and brothers and sisters and cousins of all living things, without exception. Everything everywhere is an expression of oneness. This is both scientific fact—inescapable and inspiring—and theological value—to be is to belong is to be community. Our oneness with all creation impels us to recognize community with all creation. God’s oneness is expressed through creaturely solidarity and passion and compassion for all.

Rather than looking for God in some supernatural realm removed from or in opposition to the oneness permeating the living cosmos, our explorations invite us back home, to recognize God as the super, natural one!¹⁵ God is found pervading nature’s richness, disturbing the still predictability of entropy with eddies and whirls of increasing order, such as to bubble into rivulets of organization and life, which wash into a mindfulness that transcends species and erupts into awareness and self-awareness.

That fecund awareness is one of both boundary breaking *and* of uniqueness, simultaneously. Creation theology is iconoclastic—where some would establish distinctions, our embodied creatureliness also invites commonality across division, as Hans Jonas already stated:

The *continuity* of descent linking man with the animal world made it henceforth impossible to regard his mind, and mental phenomena in general, as the abrupt intrusion of an ontologically alien principle in the total stream of life. Man’s isolation, the last citadel of dualism, disappeared, and he could once again use his knowledge of himself to interpret the totality of which he was a part.¹⁶

We are stardust—we are all stardust. Seeing all creation as phenomenologically diverse yet ontologically one invites a celebration of the relatedness of all natural events—including each of us and all of us. This evolving emergence of growing complexity never violates the constraints of physics and its component parts. From its very inception, all life emerges from prior life, and life itself emerges from the organic and the nonbiological, so that all

of creation is part of a single web, a single interconnected, related, growing process, in which there seems to be a rise in complexity, a rise in experience, ultimately perception, and of consciousness. When we connect with other living things, we tap into a relationship created by shared origins, common organization, overlapping responses to this wonderful planet. Anyone who has ever loved a pet, stood in awe at the shore of the sea as dolphins frolicked, marveled in wonder as salmon returned to their cycle of death and life, stood in silence near a deer frozen in alert attentiveness, or even peered into a microscope at a simple bacterium and reflected on our common cellularity can attest to the profound inviting power of our commonality. Creation invites, "Hallelujah!"

A creation theology takes seriously that emergent evolution simultaneously highlights continuity and discontinuity. Rare are those aspects of nature that do not have some earlier, simpler expression at a more fundamental level. Jonas is most instructive on this point saying: "We can see everything surpassing animality as a new stage of mediate relationship to the world that is already beginning to take form in animals and, in turn, is already based upon the mediate nature of all organic existence as such."¹⁷ Even as a phenomenon can reach toward novelty, it does so on the shoulder of its emergent context. So it is with inwardness, subjectivity, mindfulness, and consciousness, which some take to be the defining traits of humanity, our unique and exclusive prerogative. One need not embrace a full-blown panpsychism to recognize the roots of mindfulness¹⁸ far down into the simplest levels of creation, and scientific evidence is extending mindfulness to the very earliest levels of the biosphere, perhaps even beyond. A few suggestive examples will suffice (note that in each case, I am citing cases that went against what experts "knew" the life form was capable of, and that I am "descending" the ladder of evolution with each example):

- Reports of a chimp that prove that nonhuman primates plan for the future, in this case by stockpiling rocks during the night to fling at unwelcome human visitors at the Furuvik Zoo in Sweden.¹⁹
- The parrot, Alex, who broke through a series of presumed limits on what birds allegedly could learn: "Birds cannot learn to label objects, they said. Alex did. OK, birds cannot learn to generalize. Alex did. All right, but they cannot learn concepts.

Alex did. Well, they certainly cannot understand ‘same’ versus ‘different.’ Alex did.”²⁰

- Rooks, Eurasian members of the crow family, were able to spontaneously learn to cooperate to move a platform, with each bird tugging on an end of a rope simultaneously to make it possible to get the food on the platform.²¹
- A decapitated rooster lived for eighteen months, fed with an eyedropper directly into its throat; it gained five and a half pounds, walked around and even attempted to crow. This Colorado animal demonstrates mindfulness, but has no brain!²²
- Two neuroethologists, from the University of Toulouse and Australian National University in Canberra, taught free-flying bees to track a trail of colored marks, which they were then able to do in a completely unfamiliar maze. They learned to demonstrate delayed matching-to-sample (DMTS) and were able to generalize to situations never previously encountered, learning an abstract relation.²³
- A team of Japanese researchers of Hokkaido University demonstrated that *Physarum* slime-mold amoebas demonstrate the ability to memorize and anticipate repeated events. The study showed “a primitive version of brain function” in an organism that has no brain! Biophysicist Toshiyuki Nakagaki noted that this finding “might be a chance to reconsider what intelligence is.”²⁴

As Hans Jonas teaches, “Whether we give this inwardness the name of feeling, receptiveness, response to stimuli, volition, or something else—it harbors, in some degree of ‘awareness,’ the absolute interest of the organism in its own being, agency, and continuation.”²⁵ Human consciousness may feel particularly precious, and rightly so. But it is also part of a broader phenomenon that extends across living things, beginning with responses to stimuli that move toward self-preservation and pleasure and away from death and pain. Mindfulness appears to pervade creation—fashioned of the same stuff as humans are. It may differ in kind, but it shares a resistance to obliteration and sameness that is found in matter as well as throughout the biosphere. Matter, it seems, is neither inert nor brute. It upwells, in a rich range of characteristics, responses, reactions, and finally in living things, to intentions and self-awareness.

We are a part of nature. Yet we are also apart from nature, aware of our own awareness, living with an intensity and complexity of feeling and reflection that we do not find in the same degree elsewhere in our natural family. Same yet different, related yet distinct, as we ponder our cousins in creation our awareness of marvel is simultaneously an awareness of our distinctiveness. Only a distinctive creature could summon feelings of marvel, relationship, and connection. And only a particularly mindful creature could think about the wonder of such thoughts and choose to act on them. In true dipolar fashion, a creation theology bids us acknowledge both our embedded commonality and our distinctive uniqueness. Creation asks of us to say, "Amen!" and to choose. An embodied theology of creation invites its children to partake of freedom, to actualize real agency.

Notes

1. By "Dominant theology" I mean the Western integration of Plato's and Aristotle's writings into the Scholastic schools that dominated Christian, Muslim, and Jewish theologies for most of the medieval period, ideas that have continued to dominate much of the field of philosophy in the modern period. According to this approach, there is an objectively true and eternal set of ideas that our minds can track—that God is the supreme example of this kind of eternal, transcendent, spiritual reality vis-à-vis the cosmos, as our souls to our bodies, and that our concepts correspond to these objective categories and that timeless truths are revealed to us largely independent of our brains, bodies, or cultures, because truths rise above particularities and are best distilled through human reason and expressed in language.
2. Pierre Simon, Marquis de LaPlace, *Philosophical Essays on Probabilities*, trans. Frederick Wilson Truscott and Frederick Lincoln Emory (New York: Cosimo Books, 2007), 4.
3. See Brian Greene, *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory* (New York: Vintage Books, 2000), for an eloquent and passionate presentation of this unflagging search.
4. In fairness, some recent descriptions of natural laws do acknowledge that the law is a descriptive tool, a conceptual generalization of concrete phenomena, not an objective reality of its own. For example, "In science, a law is a descriptive principle of nature that holds in all circumstances covered by the wording of the law (Daintith & Martin, *Oxford Dictionary of Science* (New York: Oxford University Press, 2005, 464)" or "in logic, a stated regularity in the

- relations or order of phenomena in the world that holds, under a stipulated set of conditions, either universally or in a stated proportion of instances." *Encyclopedia Britannica*, s.v. "Nature, law of," *Encyclopedia Britannica Online*, <http://www.search.eb.com/eb/article-9055050> (accessed July 6, 2009).
5. "Secondary and approximate" remains quite significant. Newtonian physics, for example, is also secondary and approximate, yet we continue to rely on it for daily life and for most mechanics.
 6. The astute reader will discern echoes of Franz Rosenzweig. See "The New Thinking," in *Franz Rosenzweig, Philosophical and Theological Writings*, ed. Paul. W. Franks and Michael L. Morgan (Indianapolis: Hackett Publishing Company, 2000), also found in *Franz Rosenzweig's "The New Thinking,"* ed. Alan Udoff and Barbara E. Galli (Syracuse: Syracuse University Press, 1999).
 7. See William R. Stroeger, "Contemporary Physics and the Ontological Status of the Laws of Nature," *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*, ed. Robert John Russell, Nancey Murphy and C.J. Isham (Notre Dame: Notre Dame Press, 1999), 207–31.
 8. Louis Jacobs, "Jewish Cosmology," in *Ancient Cosmologies*, ed. Carmen Blacker and Michael Loewe (London: George Allen & Unwin Ltd, 1975), 29. A page later, he observes that the concept of universal law "is anachronistic when applied to the thought of the Rabbis." *Ibid.*, 30.
 9. John Archibald Wheeler, in *Problems in Theoretical Physics*, ed. A. Giovanni, F. Mancini and M. Marino (Salerno: University of Salerno Press, 1984).
 10. Rolf Landauer, "Computation and Physics: Wheeler's Meaning Circuit," *Foundations of Physics* 16 (1986):551–64.
 11. A controversial but evocative expression of this sentiment is Mach's Principle, which states, "The inertia of any particular matter is attributable to the interaction between that piece of matter and the rest of the universe." See John Daintith in *Oxford Dictionary of Physics* (Oxford: Oxford University Press, 2005), 297. Mach's insight, contested to this day, had an important impact on Einstein's formulation of general relativity.
 12. Saadia Gaon, *The Book of Doctrines and Beliefs*, ed. Samuel Rosenblatt (New Haven: Yale University Press, 1948), 96.
 13. Alfred North Whitehead, *Process and Reality: An Essay in Cosmology*, ed. David Ray Griffin and Donald W. Sherburne, (New York: The Free Press, 1978), 343.
 14. Isa. 55:12.
 15. The idea for the comma and the term comes from Sallie McFague, *Super, Natural Christians: How We Should Love Nature* (Minneapolis: Augsburg Fortress Publishers, 2000).

16. Hans Jonas, *Mortality and Morality: A Search for God after Auschwitz*, ed. Lawrence Vogel (Evanston, IL: Northwestern University Press 1996), 63.
17. *Ibid.*, 77.
18. The insight of Milton Steinberg is pertinent here: "The entire universe, as I see it, is the outward manifestation of Mind-energy, of Spirit, or to use the older and better word, of God. God is then the essential Being of all beings, though all beings in their totality do not exhaust Him. It is His reason which expressed itself in the rationality of nature, in the fact that all things behave in conformity with intelligible forms, in the fact, in brief, that the world is cosmos not chaos. His power moves in the dynamisms of physical reality. His will is the impulse behind the upsurge of life on this planet. Individualized, He is the soul of man whose thought processes are infinitesimal sparks of His infinite fire, whose moral aspirations are fragments of His vast purpose, whose yearning to create is but an echo of His cosmic creativity. And He is an ethical being, not so much in the sense that He enters into relations with His own expressions, as in the deeper sense that He is the fountainhead, source, and sanction of man's moral life. The human quest after freedom, truth, goodness, and beauty is but the splintered spearhead of the divine drive. So to me, the whole panorama of earth and sky, the tempestuous progress of living things, and the tortuous career of humanity, are the external shell of a process wherein God realizes His character." Milton Steinberg, *A Believing Jew: The Selected Writings of Milton Steinberg* (New York: Harcourt, Brace and Company, 1951), 19.
19. Coco Ballantyne, "Planning of the Apes," *Scientific American* (May 2009), 27.
20. Irene Pepperberg, *From Alex & Me: How a Scientist and a Parrot Discovered a Hidden World of Animal Intelligence—and Formed a Deep Bond in the Process* (New York: HarperCollins Publishers, 2008), quoted in *Discover Magazine* (February 2009), 77.
21. Emily Anthes, "Head Lines," *Scientific American Mind* (August/September 2008), 8.
22. David McFarland, *Guilty Robots, Happy Dogs: The Question of Alien Minds* (Oxford: Oxford University Press, 2008), cited by Nicole Branan, *Scientific American Mind* (August/September 2008), 82.
23. Christof Koch, "Exploring Consciousness through the Study of Bees," *Scientific American Mind* (January 14, 2009).
24. Tetsu Saigusa et al., "Amoebae Anticipate Periodic Events," *Physical Review Letters* 100, no. 1 (January 11, 2008).
25. Jonas, *Mortality and Morality*, 69.