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Creative Genesis

Escalating Naturalism and Beyond

Does a plausible worldview need some explanations that exceed the natural? Hard naturalisms insist not, but softer, or more open naturalisms find that natural processes can produce ever more complex results – moving from matter to life to mind – in a superb natural history. This invites a religious naturalism, and challenges it. Repeatedly the critical junctures require analysis pressing beyond merely scientific explanations: whether such narrative history is self-explanatory, whether each stage is sufficient for the next when more emerges out of less, what account to give of the creative genesis found in cybernetic genetics, the rise of caring, surprising serendipity, the opening up of new possibility space. Even scientific rationality depends on non-empirical logic, particularly in mathematics. Thoughtful persons are the most remarkable result arising out of natural history. If there is no supernatural, at least nature is super. Further still, the intensity of personal experience suggests the Presence of transcending divine Logos, in, with, and under nature.

1. Nothing but Nature?

When something has been explained as being “natural,” are explanations over? Local scientific explanations (how it rains) leave room for more inclusive explanations. *Why* is there the phenomenon of water with its unique properties, making life possible? One may get a further explanation how water came to be formed or placed on Earth, the polar nature of the water molecule, its liquidity, and so on. But there will linger the still further question: whether the presence of water signals any propensity of nature to support life. That will move from physics toward metaphysics, and if one claims that these metaphysical explanations too are more natural activity, we start to become concerned that the explainer has become so resolutely naturalistic that nothing is ever likely to count as a trans-naturalistic form of explanation. True, comes the naturalist’s reply, there is nothing but nature, but nature can be quite surprising.

A frequent conviction is that science demands a naturalistic metaphysics. Science shuts out any transcending (= supernatural?) monotheism. Or if it

does not demand it, it makes a naturalistic metaphysics the most plausible hypothesis. That is the sort of explanation that has worked so impressively for four hundred years in science, and so: Keep all explanations natural. Celebrate a nature that can evolve into spirit, perhaps uniquely so in humans. Distinguish culture from nature if you like, but no dualism is allowed: metaphysically, culture too is natural, not supernatural. Keep it all in a naturalistic explanatory box – though you may have steadily to enlarge the box. Naturalists will concede that many fundamental issues about the uni-verse are unsettled. What came before the Big Bang? Is there life only on Earth? Some will be settled in the future, some may never be settled. But what we do know (or what is at least the most plausible expectation) is that if any answers ever come they will be of the naturalistic kind, and not of any supernaturalistic kind. There will be limit questions. Why is the world mathematical? Rational? Why are the contingencies what they are? These are philosophical questions, but any answers will come by putting some spin on what the natural sciences find, and not by finding any divine behavior shaping the nature of nature.

This is often coupled with the view that the Biblical accounts of divine activity are couched in a pre-scientific mythology, an outdated box. Any truth there must be de-mythologized, which means to recast it into something congenial to science. One retains the kernel of truth removed from an outdated husk. This kernel can be expressed existentially, and non-mythologically (as in Rudolf Bultmann). But is this kernel scientific, or naturalistic?

One problem with holding that all explanations must be naturalistic is that it is hard to know when explanations might be over. This is true whether science seems to be going further and further up, out, back, or down. The universe – this universe at least – is some 13.7 billion years old. If one goes back to the start up Big Bang, what then? What before? Why the sort of universe we happen to have? If, or when, further explanations are forthcoming, will their character be scientific, or metaphysical, or religious? Or will this depend on distinctions we will have to formulate when we have such explanations in hand? Scientists are not likely to say that we have gone all the way down with the discovery of the Higgs boson. They may not think that we will ever go all the way down – partly because there is no all the way down, partly because doing such science becomes progressively more theoretically and empirically complicated, counter-intuitive, and expensive.

Naturalism, like theology, comes in versions. In what we might think of as a baseline *hard naturalism*, nature is all there is; nothing supernatural exists. Nature is its own eternal necessary and sufficient cause. Determinism

is true, at least statistico-determinism (washing out microscopic indeterminacies). Nature is fundamentally nonpersonal; humans are epiphenomenal. Mind has evolved from matter but is nevertheless eccentric to it. Nature is essentially value-neutral. Human values are real yet nothing more than human values, our own creations. They neither have nor need any explanation outside themselves by grounding in natural or sacred values. The scientific method is the only route to truth; every other supposed method is myth and emotion.

More recently naturalism is often of a “softer” kind, a liberal naturalism¹. Nature contains within itself a creative, transformative principle, producing emergent novelty. This results in freedom and directedness increasingly in the higher evolutionary forms. Nature is simple and non-personal across great ranges, but locally and at complex levels becomes personalized. Persons in their cultures stand in essential continuity with nature. Both the physical and the psychical dimensions of nature are keys to its understanding. Values are not all human values; there is intrinsic value in natural things. The scientific method can teach us much but not all about nature. Philosophical and religious judgments are required positively to evaluate its meanings.

We next move through some half dozen shifts in perspective arising within the natural sciences opening up the possibilities of a deeper naturalism, a nature about which one can be religious. But these same shifts equally keep open the more ultimate question whether nature is all that there is, the question of transcendence.

2. Intervention, Causes, Gaps, Chaos, Openness

Across the last century, beginning with the (once) “new physics,” and increasingly in recent decades in the biosciences, nature has an openness mixed in with its causality. Classical naturalists insisted, against the theologians, that the natural world doesn’t need any interfering with. Nature has no gaps, needs no additives. It is a seamless whole. But naturalists do not and cannot trace their causal chains in detail back through all the complexities and contingencies to the Big Bang. They find them in some places, and project them for the whole. Both in the nitty-gritty of astronomical history (why is there our solar system with its nine planets) even more in our

¹ See De Caro and Macarthur 2004, 2010; Hogue, 2010; Crosby 2002; Stone 2008; Drees 1996.

Earthen planetary history (trilobites becoming elephants), they find causal networks with chaotic bubble holes. Still, it will be claimed that no further explanations are needed, or in order. Law and chaos is all the explanation there is, they mix creatively, but no more needs to be said.

But perhaps something more does need to be considered. The matter-energy networks have some remarkable properties. Consider the phenomena commonly gathered under the term "anthropic principle," a term originated by cosmologists. In the last half century scientists have found dramatic interrelationships between astronomical and atomic scales that connect to make the universe "user-friendly" and "fine-tuned." Astrophysical phenomena such as the formation of galaxies, stars, and planets depend critically on the microphysical phenomena. In turn, those midrange scales where the known complexity mostly lies, depend on the interacting microscopic and astronomical ranges².

From one perspective, in the Big Bang everything is flying apart in a universe continually expanding and generally uniform (isomorphic); but from another perspective, there are local departures from the overall smoothness. In these non-isomorphic regions, under the influence of gravity, matter clumps up into stars, into galaxies, the loci of ongoing creativity. The particulars of such stars and galaxies may depend on earlier random fluctuations, perhaps even quantum indeterminacies. Or they may depend on the intersections of previously unrelated causal lines (stars crashing into each other), or involve chaotic features. At the same time, the overall processes are lawlike (making celestial mechanics possible, or explaining stellar evolution).

The universe so huge that we can see only the parts of it in our light cone, in which the light has had time to get to us. The Hubble Space Telescope has imaged galaxies over ten billion light years distant. But if the scale of the universe were much reduced (to galaxy size for instance, 100,000 light years across), there would not have been enough time for stars to form and generate the elements beyond hydrogen and helium, elements which later make life possible. If the expansion rate of the universe had been a little faster or slower, then the universe would already have recollapsed or the galaxies and stars would not have formed. Change slightly the strengths of any of those four forces that hold the world together, change critical particle masses and charges, and the stars would burn too quickly or too slowly, or atoms and molecules (including water, carbon, and oxygen) or amino acids (building blocks of life) would not form or remain stable.

2 For summaries of a large literature, see Barr 2001; Leslie 1989.

Nature aggregates and builds. Across this long timespan in the rapidly expanding universe, the stars are the furnaces in which all but the very lightest elements are forged, a process called nucleosynthesis (Clayton 1983). The stars run their courses and some explode as supernovae to disperse the heavier elements from their production sites throughout space. Such matter is condensed as planets, and life evolves out of such elements. Further, the various heavier elements (carbon, oxygen, sulphur, nitrogen, silicon – all of the elements heavier than hydrogen and helium) are synthesized in proportions that make later planets and life possible.

This energetic matter not only clumps, it complexifies. These elements, made of protons, neutrons, electrons, inner positive nuclei and outer negative shells, are forged with bonding capacities, almost like grappling hooks, making possible endless recombinations.

Do we really need a universe with a hundred billion galaxies, each with a hundred billion stars? Maybe we are lost out there in the stars? Do we need all those galaxies, stars, asteroids, cosmic dust, dark matter, dark energy? The scattering of galaxies, stars, asteroids, black holes, and so on, is what it is, and explanations are over. Still, we stand on an Earth, the dirt under our feet, incarnate in the flesh and blood of our bodies and brains, and think about cosmology. The creative universe did produce us. The human person is composed of stardust, fossil stardust! And we have no scientific theory as to how we might have obtained such bodies and brains without some remarkable elemental source, such as this singular Big Bang provides.

John Barrow surveys the universe: “Many of its most striking features – its vast size and huge age, the loneliness and darkness of space – are all necessary conditions for there to be intelligent observers like ourselves” (Barrow 2002, 113). Stephen M. Barr puts the point this way, with emphasis:

Even if all the physical relationships needed for life to evolve were explained as arising from some fundamental physical theory, *there would still be a coincidence*. There would be the coincidence between what that physical theory required and what the evolution of life required. If life requires dozens of delicate relationships to be satisfied, and a certain physical theory also requires dozens of delicate relationships to be satisfied, *and they turn out to be the very same relationships*, that would be a fantastic coincidence. Or, rather, a series of fantastic coincidences (Barr 2003, 145).

Paul Davies says, we hit the “cosmic jackpot” (Davies 2007).

What should we make of this? Sometimes we dismiss the puzzle, noticing that in no other kind of universe could humans have evolved to worry about these things. We are here and it really isn’t surprising that the universe is of such kind as has produced us. We knew before we started our search that the universe has all the prerequisites for our being here. But those who

want a fuller explanation will find it quite impressive to discover that what seem to be widely varied facts really cannot vary widely, indeed, that many of them can hardly vary at all, and have the universe develop the matter, life, and mind it has generated.

Naturalists may reply: this is just the luck of the draw for this universe – perhaps one among multiple universes, most of them unlucky. But that is a rather speculative explanation – to invent myriads of other worlds existing sequentially or simultaneously with ours, in order to explain how this one can be a random one from an ensemble of universes – and so a little less surprising in its anthropic features. Meanwhile, what has increasingly been enforced is the singularity of this one. Roger Penrose is impressed by “the extraordinary degree of precision or ‘fine-tuning’ for a Big Bang of the nature that we appear to observe.” He concludes that ours is “an extraordinarily special Big Bang” (Penrose 2005, 762, 726). Martin Rees concludes: “We should surely probe deeper, and ask why a unique recipe for the physical world should permit consequences as interesting as those we see around us” (Rees 2001, 163). Maybe this natural history is just lucky. But nothing in contemporary cosmology prevents theologians and philosophers from wondering whether the start up looks like a set up.

Those interesting consequences that we see around us are most notably life and mind on Earth. That mixture of creative order and openness continues, indeed escalates, in the adventures of our planetary natural and cultural history, to which will increasingly return in the argument to follow.

3. Necessary and/or/not Sufficient – Self-explanatory Nature

The deeper explanation, naturalists may reply, is that nature is a self-generating system. The end of the story may not be already there in the beginning, but the setup is the startup of a self-organizing system. Just watch what it does, more or less automatically. Generating these heavy elements, which on Earth become the seeds of life, does seem deterministic in origin. In that sense the periodic table of chemical elements is latent in the Big Bang – including those remarkable biogenic elements. So are the thirty-two crystal classes. Molecular structures, molecules and lattices, as found in water, pyrite, salt, silica, inevitably develop somewhere.

The system is prone to modular constructions, which may get intertwined or compounded (hypercycles); and the stable and metastable ones survive. Random elements combine with overall order (as with fractals). Beyond aggregation, matter is regularly spontaneously organizing, as when mol-

ecules and crystals form. In some situations, especially with a high flow of energy over matter, patterns may be produced at larger scales (Prigogine and Stengers 1984). These patterns may further involve critical thresholds, often called self-organized criticality (Bak 1997). Such processes are “automatic,” sometimes called “self-organizing,” although initially the “auto” should not be taken to posit a “self,” but rather an innate principle of the spontaneous origination of order.

Given some start up Big Bang, contingent or inevitable, there might also be contingency en-route in the automatically unfolding natural history. The basic laws and constants might (after the start up) be determinate, but there might be contingency nevertheless within the framework of such basic laws and constants. The laws include quantum physics, for example, which has indeterminacy within it, by most accounts an ontological indeterminacy. If quantum events can ever be amplified to larger scales, those results would be to some degree contingent.

In fact, we have not far to seek for evidence that molecular and even atomic phenomena are often amplified. In biochemistry and genetics, events at the phenotypic level are profoundly affected by events launched at the genotypic level. Such events may sometimes be affected by quantum events, as when random radiation affects point mutations or genetic crossing over. If radioactive decay caused a mutation that altered efficiency in photosynthesis and conveyed survival advantage, that would affect events at ecosystem scales. Indeed, by the usual evolutionary account, the entire biological tale is an amplification of increments, where microscopic mutations are edited over by macroscopic selective processes. These increments are most finely resolved into molecular evolutions.

Mostly, quantum indeterminacies wash out at our native range levels. That is required for the order of natural law. A macro-determinism remains, despite a micro-indeterminism. The physical world is in fact routinely described in statistical terms. This is often because of our epistemological uncertainty, incomplete information. But objectively random processes at one level can yield reliable results at other levels; the random distribution of grains of clay in a brick nevertheless permits a stable and ordered wall in a building. But in statistical systems with chaotic elements, some of them genuinely indeterminate, random differences at a threshold during initiation can lead to widely different outcomes. Even on global scales, climatologists now allow that weather systems, even climate systems, have indeterminate dimensions, at the same time that they are statistically causal (Lorenz 1968). Given billions of years of natural history, it seems likely that at times and places, mutations bubbling up from atomic indeterminacies have resulted in

important shifts in genetic codings, which have resulted in important novelities in natural history.

Well, naturalists will reply, that's just what we were claiming: that the system is self-organizing – and that involves both law and novelty. But then the results of this innate self-organizing tendency are as open as they are inevitable. Nature is full of surprises – and some sort of surprises are guaranteed, but what they exactly are, no one can say in advance. There is always and only self-sufficing nature pouring forth, but the specifics of the surprises are not front-loaded into the system.

Indeed, it is impossible to say that the three major levels (matter-energy, life, mind) are built into this self-organizing. Each level is necessary for the next, but no stage seems sufficient for the next. Each stage allows the next, but no stage logically implies the next. No scientific law, plus initial conditions, predicts the surprisingly emergent steps of life and mind. In some moods, the vast distances between the originating Big Bang, the origin of life on Earth, and the origin of human mind, billions of years apart, suggests minimal connections. Even more provocatively, each stage launches escalating creativity. Outrageous luck? Or are there “attractors”? Is there a subtending field, a deeper source?

There is certainly no ultimacy in the ultrastructures as now known. We have hit no “rock bottom” in physics, and have few signs that we ever will or can, or would know when we had. We are nowhere close to an account of nature that makes all the events in natural history self-explanatory, not at the Big Bang, not at the origin of Earth, not at the origin of life, not at the origin of human life, not at the origin of culture, not at the origin of science, ethics, and religion, not with nature evolving into spirit. There is nothing self-explanatory about dark energy. Figuring out what it is, if it actually exists, is so complex, and may involve chasing an unending crescendo of unknowns, that one recent commentator remarks, “Dark energy might never reveal its nature” (Cho 2012, 1091). Meanwhile it is not just what we don't know, but what we do know that is startling: a nature that starts with matter-energy and produces life and mind.

What these claims about self-organizing amount to is not a nature with built in explanations. Rather, the natural sciences keep opening up the possibilities of a deeper naturalism, a nature about which one can be religious. And, again, these same shifts equally keep open the more ultimate question whether nature is all that there is, leaving open the question of transcendence.

4. More out of Less: Emergence, Cybernetics, Serendipity, Caring

The discovery that information is a critical determinant of organic-evolutionary history has thrown the creativity/causal/contingency debate into a new light. Various concepts of “emergence” have been around for centuries. “More is different” (Anderson 1972). Cybernetic emergence has become the most recent focus. In classical physics, there were two metaphysical fundamentals: matter and energy. Einstein reduced these two to one: matter-energy. In the rapidly expanding universe, there is conservation of matter, also of energy; neither can be created or destroyed, although each can take diverse forms, and one can be transformed into the other. With genes on Earth, the novelty is that matter-energy enters into information states. The biologists also claim two metaphysical fundamentals: matter-energy and information. The latter is radically novel. There appears proactive information about how to compose, maintain, communicate, and elaborate vital structures and processes. This is information about directed use, which is not present in the previous physico-chemical world.

Now there appears a new type of order. A crystal is ordered (formed) spontaneously. There is repeated spontaneous structure formation. A protein molecule is ordered because it is “ordered” to form under the “informed” direction of a DNA molecule, that molecule switched on by the organism with its needs. The various spontaneously assembled phenomena in physics and chemistry, for example those called dissipative structures (such as Bénard cells that form in liquids with high temperature gradients) have a physical order but nowhere approach this biological sense of order. Nothing is transmitted from one generation of Bénard cells to the next. In similar circumstances such cells generate again, but they do not regenerate. There is no increasing complexity in the course of reproduction.

Two decades ago what needed to be explained was the generation of complexity. In recent decades scientists have come more to focus on the information required for specifying and generating such complexity. Norbert Wiener, a founder of cybernetics, insisted: “Information is information, not matter or energy” (Wiener 1948, 155). That differentiates physics from biology; and, biologists argue, biologists need to be alert to this. George C. Williams is explicit: “Evolutionary biologists have failed to realize that they work with two more or less incommensurable domains: that of information and that of matter. ... The gene is a package of information” (quoted in Brockman 1995, 43). The earthen world, biologists now insist, is composed by information that superintends the uses of matter and energy. James A. Shapiro concludes: “Thus, just as the genome has come to be seen as a highly

sophisticated information storage system, its evolution has become a matter of highly sophisticated information processing" (Shapiro 1998, 10; 2005).

What makes the critical difference is not the matter, not the energy, necessary though these are; what makes the critical difference is the information breakthrough with resulting capacity for agency, for doing something. Afterward, as before, there are no causal gaps from the viewpoint of physicist or chemist, but there is something more: novel information that makes possible the achievement of increasing order, maintained out of the disorder. The same energy budget can be put to very different historical uses, depending on the information in the system. Chemical reagents become biological agents. For scientists what emerges is "cybernetics." For philosophers, what appears is "telos." Theologians will wonder whether what is added is headed toward "logos."

This cybernetic searching and improvising at times gets really lucky. Novel possibilities open up whole new regions of search space; old molecules recombine to learn new tricks in unprecedented circumstances. In such cases of co-opted emergence, repeatedly compounding, something that is genuinely new pops out, pops up. The novelty is, of course, based on the precedents, but there is genuine novelty not present in any of the precedents. What emerged required the precedents, but the presence of the prior organisms did not determine or make inevitable these results. Evolutionary genesis can luck into exciting serendipity.

Biologists, a century back, used to call such events "saltations." Physicists, pressed for words from their discipline, might call it a "quantum leap." Maybe we need a new term: "cybernetic leap." Biologists inclined toward chance may call this "tinkering" (Jacob 1977). Biologists impressed with the novel results will call it evolutionary "exploring." Historians will remark that such events are narrative adventures; they do not follow any Aristotelian logic, nor any hypothetico-deductive science. One needs a metaphysics for such co-option because there appear new ontological levels, both actual and possible. Sight appears where before were only heat stress proteins (that they happened to be clear was co-opted to make eyes), language where before was only skin pressure sensibility (co-opting such cells to make ears). Sight and language open up the possibility of writing/reading. Co-option is a vital key to historical creativity.

Retrospectively, of course, after these novelties happen, the historian can trace the steps by which events happened. The paleontologist and paleomolecular biologists can give scientific explanations, a posteriori. But at each developmental juncture, were (*per impossible*) a biologist standing there watching, nothing is a priori. Prospectively, if one could stand at each pre-

sent moment, at each “now” over the course of evolution, there is always the great unknown. The pivotal element in a metaphysics of such evolutionary biology is the future, not the past, not even the present. Past and present are necessary but never sufficient for the future. In that sense our accounts will always be insufficient, incomplete, before this capacity for future innovation.

Sometimes the explanatory account is by laws applied to initial conditions, and the same laws again reapplied to the resulting outcomes, now treated as further initial conditions. But sometimes, with co-options, endosymbioses, lateral genetic transfers, mutations, the outcomes are not just further sets of initial conditions. The novel outcomes revise the previous laws; the rules of the game change, as well as the initial conditions, and the future is like no previous past. One can say that all this surprising serendipity is somehow “inherent” from the start; but the explanatory power of such a claim is rather vague. Predictably, there will be unpredictable co-options!

Critical turning points in the history of life hinge on events more idiosyncratic (unique, one-off events) than nomothetic (law-like, inevitable, repeatable trends). The main idea in co-option is the unpredictable and unexpected; co-option is as revolutionary as it is evolutionary. Genes in living systems explore a combinatorially immense space of possibilities through the evolutionary process; They do so with longstanding creative genesis, punctuated by serendipity.

Such creative serendipity resulted in the human emergence, with dramatic and unique cognitive powers. How has the universe, starting with the Big Bang, and proceeding through rocks and dinosaurs, generated beings, *Homo sapiens*, capable of discovering mathematical truths (such as pi, or the Pythagorean theorem, or proofs in prime number theory) that are not natural, not true on the strength of anything that has happened in natural history? Similarly with their capacity to discover moral truths (such as the Golden Rule or the value of justice and compassionate selfless love). Nature is a system capable of generating the human mind – nature per se, even if culture is also required, such culture being natural too. Surprisingly our highest achievements do not get their authority from our biological or geological or physical origins. This requires that we go over and above, or bottom out, in more comprehensive, forms of explanation. We have cognitive powers that transcend the natural order.

Terrence Deacon catches this uniqueness: “Hundreds of millions of years of evolution have produced hundreds of thousands of species with brains, and tens of thousands with complex behavioral, perceptual, and learning abilities. Only one of these has ever wondered about its place in the world, because only one evolved the ability to do so” (Deacon 1997, 21). Jerome

Kagan puts it this way: "What is biologically special about our species is a constant attention to what is good and beautiful and a dislike of all that is bad and ugly. These biologically prepared biases rend the human experience incommensurable with that of any other species" (Kagan 1998, 91). When Thomas Nagel attempts to connect "mind and cosmos," he concludes that "the materialist neo-Darwinian conception of nature is almost certainly false" because nothing in the history of humans evolving in African jungles adequately explains the extraordinary powers of the human mind. He does not favor a monotheistic account either, and he is stumped for any plausible account of how such mindful humans arrived on Earth" (Nagel 2012).

Humans are remarkable not only for their cognitive abilities but in humans also there is a remarkable evolution of the capacity for caring. We live at the range of the most caring; we ourselves may embody the most capacity for caring. All living things have "needs." There is proactive caring wherever there is "agency," wherever there is "motivation," where there is "locomotion." Irritability is universally present in life, but sentience, co-present with neural structures, brings the capacity to move about deliberately in the world, and also to get hurt by it. A neural animal can and must love something in its world and is free to seek this, a capacity greatly advanced over anything known in immobile, insentient plants. The animal has the power to move through and experientially to evaluate the environment.

In humans, there arise more inclusive forms of caring. Such wider vision requires increasing cybernetic complexity, a brain that can evaluate others not only in terms of helps and hurts, but also with concern for their health and integrity. This radically elaborates new levels of cultural information, and caring. Humans care about family, tribe, nation, careers, ideational causes, such as biological science, French literature, or the Christian faith. Ethics shapes caring. In due course, humans alone on the planet can take a transcending overview of the whole – and care for life on Earth.

Biologists several decades back would have replied, yes, there is caring but it is selfish. Such selfishness was soon stretched to cover benefits gained by "caring about" father, mother, niece, nephew, cousin, children, aunts, uncles, and so on, and further along the indefinitely extended lines of relationship, lines that fan out eventually to all conspecifics (half of which are also potential mates, which sometimes also need to be cared about). More recently, something of a new picture has been painted over the old, although much of the old picture still shows through.

In the last couple decades, biologists have found as many ways in which natural selection favors co-operation as it does competition. In fact, Martin Nowak, who calls himself a mathematical biologist and models various

kinds of natural selection on computers, claims: "Competition does not tell the whole story of biology. Something profound is missing. Creatures of every persuasion and level of complexity cooperate to live. ... This is the bright side of biology" (Nowak 2011, xii–xiv). "Cooperation is the master architect of evolution" (xviii).

Humans can come to care about what is not locally present. There can be, so to speak, concern at a distance, caring not only interestedly but disinterestedly about others. When knowledge becomes "ideational," these "ideas" make it possible to conceptualize and care about what is not present to immediate experience. Chimpanzees cannot care about the Ugandans in poverty, even if they encounter the poor at the edge of their forest, but Christians elsewhere in the world may, although they have never been to Uganda.

Human rationality enables humans to anticipate quite novel futures, to choose potential options, to plan for decades according to chosen simulations, or policies, and to rebuild their environments accordingly. The result is the capacity to care for idealized futures, and to work for such futures. "Global capitalism is working now to make the rich richer and the poor poorer, but what if ..." The result of these ideational powers – though persons continue to act in their generic self-interest – is to pull the focus of concern off self-center and bring into focus others in the community of persons. Caring can sometimes become more "inclusive," recognizing that one's own self-values are widely paralleled, a kind of value that is distributed in myriads of other selves, in my tribe and in others. One comes to participate or share in this larger community of valued and valuing agents.

What the self values can only be sustained if people act in concert. Cultural reproduction, conserving what one values in one's heritage, is as much required as is conserving one's genes. But much of one's cultural heritage is trans-tribal; one is drawn to the church catholic, to democracy, to a sense of fairness in international business, to conserving tropical forests. Just this reflective element rationalizes (makes reasonable) and universalizes the recommended behavior. One expects to be helped out in a society of reciprocating helpers.

The caring-complexity in which we find ourselves must be understood comprehensively – in terms of conclusions, not just origins. That ending lies ahead, but en route, we humans are at the forefront of the story. Increased caring, like the increased complexity that supports it, is an ever open niche. Now, returning to those impressed with these escalating possibilities in natural history, cumulating in cultural history, is all this still natural? The naturalists will still say: Keep it natural. Elevate the natural, Enjoy the surprises! Others will worry that in such a nature, there is too much "bootstrapping,"

nature lifting itself up and up and up by its own bootstraps. Rocks eroding and the dirt organizing itself into the diversity of life on Earth, with one exceptional species capable of sacrificial love! Quite a surprise! Those who wish to look deeper, further, wonder whether such serendipitous emergence of caring invites us to see such a world, and our task in it, as signals of a transcendent, beyond a natural sacred.

Christians may even find increasingly plausible the account that in the evolution of such caring, there is *logos* becoming incarnate in the world. One result in the cultural history, emerging from the natural history, is the nation of Israel, and the historical presence in that history of the person of Jesus Christ, who becomes an icon of the power of suffering love, remembered across two millennia with his memory spread around the world. Perhaps this develops in culmination of this evolution of caring which begins in biological natural history. But it is difficult to imagine that this Logos coming into the world is all somehow naturally self-explanatory.

5. Predictable, Probable, Random, Possible, Possibility Space

Contemporary biologists are divided across a spectrum whether this creative cybernetic evolutionary history is entirely contingent or quite probable, even inevitable. At one end, famously, Jacques Monod, Nobel prize-winner, insists: "Chance alone is at the source of every innovation, of all creation in the biosphere." Evolutionary history is "the product of an enormous lottery presided over by natural selection, blindly picking the rare winners from among numbers drawn at utter random" (Monod 1972, 112, 138). But Christian de Duve, another Nobel prize-winner, replies: "To Monod's famous sentence: 'The universe was not pregnant with life, nor the biosphere with man,' I reply: 'You are wrong. They were'" (de Duve 1995, 300).

"Life was bound to arise under the prevailing conditions, and it will arise similarly wherever and whenever the same conditions obtain. There is hardly any room for 'lucky accidents' in the gradual, multistep process whereby life originated. ... I view this universe [as] ... made in such a way as to generate life and mind, bound to give birth to thinking beings" (de Duve 1995, xv, xviii).

Such clashes are one of the more philosophically remarkable happenings in contemporary paleontology. We get slapped in the face with what radically different metaphysical frameworks eminent biologists can read into, or out of, the same evolutionary facts. Set Cambridge against Harvard. Simon Conway Morris, Cambridge paleontologist who did the work on the fossils in the Burgess Shale, draws conclusions that

are the “exact reverse” (Conway Morris 2003, 283) of those of Stephen Jay Gould, who wrote the best-selling *Wonderful Life* based on Conway Morris’s paleontological data. Gould concludes, famously, “Almost every interesting event of life’s history falls into the realm of contingency” (Gould 1989, 290). “We are the accidental result of an unplanned process ... the fragile result of an enormous concatenation of improbabilities, not the predictable product of any definite process” (Gould 1983, 101 f). Conway Morris “aims ... to refute the notion of the ‘dominance of contingency’” (297). “The science of evolution does not belittle us. ... Something like ourselves is an evolutionary inevitability, and our existence also reaffirms our one-ness with the rest of Creation.” “Perhaps we can discern inherent within this framework the inevitable and pre-ordained trajectories of evolution?” (Conway Morris 2003, 297, xv–xvi, 24; Conway Morris and Gould 1998). On these trajectories at least, nature has a nonintentional tendency to produce intentions. This demands more explanation than random chance.

Inevitable or lucky, a surprising universe of the kind we have will also need a deeper account. We reach the same puzzle here on Earth below that we found in the heavens above. If life is inevitable, it is remarkable. If life is contingent, it is equally remarkable. Either way, there is radical creativity demanding a deeper account.

If we turn to mind, scientists range across a spectrum finding as much novelty as they do kinship with the other species. Despite finding other kinds of progress undeniable in the evolutionary record, Ernst Mayr reflects on the evolution of intelligence: “An evolutionist is impressed by the incredible improbability of intelligent life ever to have evolved” (Mayr 1988, 69). Mind of the human kind is singular on Earth, found only in *Homo sapiens*. Although consciousness long preceded humans, there is an explosive state change when humans cross a divide gaining their self-reflexive, ideational, linguistic, symbolic capacities.

The launching of life may have been random chance, but, once launched, biodiversity was highly probable, biocomplexity less probable but likely. The formation of human mind may have been serendipitous, and after that cultural diversity may have been highly probable. Cultural diversity may be peculiar and local, or local on isolated islands but cumulative on continents and accelerated at crossroads between continents. The causal connections are likely themselves to be complex.

William Day concludes that “as we arrange the sequences of evolution’s advance, we discover an unsettling implication:”

Each step is an evolutionary curve; all steps together outline an accelerating advance for all biological evolution. ... Each major step in evolution appears to take less time to

occur. And each development begins slowly but, fed by its own momentum, begins to accelerate until it races to its developed state. When it reaches a final level – a higher stage in evolution – the offspring of the new life form begin to repeat the cycle, evolving some feature that ultimately leads to another succeeding step, ... it continues to accelerate stage after stage. ... We are in the middle of something momentous taking place (Day 1984, 257f).

Although he is staggered in attempting to locate mind in the cosmos, Thomas Nagel does affirm: “My guiding conviction is that mind is not just an afterthought or an add-on, but a basic aspect of nature” (Nagel 2012, 16).

One way to think of this accelerating momentum toward the momentous is to think of the opening up of new possibility space. One can claim that the possibilities were always there, front-loaded into the Big Bang. One can with equal plausibility claim that new possibility space has opened up en route in the course of natural history. There is the generation of new possibility space in which information breakthroughs become possible. New information, as in DNA, opens up new opportunities, previously impossible to hydrogen, carbon, oxygen, iron, so long as they are devoid of it. New possibility space appeared with the co-option of certain predecessor free-living organisms to become the mitochondria and chloroplasts now pervasive in animals and plants that power life with solar energy. Some achievements that are genuinely new pop up. These are based on the precedents, but there is novelty not present in either of the precedents. What emerged required the precedents, but the presence of the prior organisms did not require or determine these results. The precedents in both their actuality and possibilities are necessary but not sufficient for the consequents. There is break-through discovery, innovative creativity.

Thomas Berry claims that the parts must be understood in the light of later-coming wholes:

The simpler elements are not fully known until their integration into more comprehensive modes of being is recognized. Later complex entities are not fully intelligible until their component parts are understood. We would not know the real capacities of hydrogen, carbon, oxygen, and nitrogen were it not for their later expression in cellular life and indeed in the entire world of living beings, including the remarkable world of human consciousness. So with consciousness: the thoughts and emotions, the social forms and rituals of the human community are as much “earth” as the soil and rocks and the trees and the flowers. We can reduce the flowers to the atoms or the atoms to the flowers. There are no atoms that are just atoms, no flowers that are just flowers. There is no earth without the human; no human without the earth (Berry 1988, 91 f).

Berry seems insightfully inclusive – at first, but maybe, on further thought, overly inclusive. The hydrogen in outer space is not flowers, or mind; the iron, carbon, oxygen on the moon is not alive. Nor is life, mind secretly

somewhere tucked into them. Moon atoms with their protons, electrons, atoms are not waiting around to string themselves together into DNA molecules, waiting for a context of sufficient entanglement to form vital nodes in networks, waiting around to form the metabolisms of life, much less waiting around to think about such metabolism. Atoms, bare, are just atoms. What they lack is vast amounts of information, of which they do not have any at all.

Suppose that a meteorite lands on Earth, releasing some iron atoms as the incandescent meteor crashes into the ground. Suppose some of those iron atoms make their way into my diet, and into my blood. Would not such meteoric iron, from outer space, work just as well as any terrestrial iron atom in the hemoglobin carrying oxygen to my brain. Does that not mean that such iron atoms have had from time immemorial the capacity for entering into cognitive processes? Passively perhaps, if overtaken by mind, but actively there is no such self-contained potential. A single atom of iron has no such possibilities within itself at all. To claim that it does is like saying that ink and paper has the Library of Congress latent within the bottle and secretly coded in the paper pulp fibers. Entering into thinking processes becomes a possibility for such an extraterrestrial iron atom only with its encounter with (only relative to) the systemic company of enormous amounts of information.

One can insist that it must always have been possible to put carbon atoms into organic cells and silicon atoms into computers, since we humans do that now somatically and technologically – and the atoms are no different from what they have been for billions of years. But it may have always been possible to do this *with* these atoms, providing that one had the know-how to do such things, but not possible lacking such information. Such information has to become possible. That is different from the claim that it has always been possible *for* carbon and silicon to self-organize into organism and computers. An iron atom is not an incipient hemoglobin molecule.

Karl Popper concludes that science discovers “a world of propensities,” open to historical innovation, the possibility space ever enlarging.

In our real changing world, the situation and, with it, the possibilities, and thus the propensities, change all the time. ... This view of propensities allows us to see in a new light the processes that constitute our world: the world process. The world is no longer a causal machine – it can now be seen as a world of propensities, as an unfolding process of realizing possibilities and of unfolding new possibilities. ... New possibilities are created, possibilities that previously simply did not exist. ... Especially in the evolution of biochemistry, it is widely appreciated that every new compound creates new possibilities for further new compounds to synthesize: possibilities which previously did not exist. The possibility space ... is growing. ... Our world of propensities is inherently creative (Popper 1990, 17–20).

The result is the evolutionary drama. “The variety of those [organisms] that have realized themselves is staggering.” “In the end, we ourselves become possible” (Popper 1990, 26, 19).

6. Nature! Super! and Supernature

What are we to make of this escalating naturalism? A naturalist may continue to insist that there is, as before, nothing but nature; there is no ontologically distinct transcendent God – or heaven, or afterlife, or angels. But nature is super. Spell nature in the upper case, capitalize even the “super.” Nature, Super. Add an exclamation mark: Super! But do not suppose Supernature. There is nothing “over and above;” but there is “ultimate ground.” Each of the emergent steps is “super” to the precedents, that is, supervenes on and surpasses the principles and processes earlier evident. Each transcends previous ontological levels. The category of the natural is elevated as it enlarges. Nature proves richer, more fertile, brooding, mysterious, than was recognized before. *Natura naturans* is as revealing as *natura naturata*. A spirited history, a history of spirit, supervenes on matter-energy. The generative power is lured toward spirit, evident in human spirits. And such nature is a supercharged nature, but still nature.

Believing in emerging spirit is plausible; we are such spirits. But believing in any Spirit (upper case) in, with, and under the process is incredible. These escalating naturalists seem quite allergic to any transcendence, but quite attracted to immanence. “Up” is not a direction in which they wish to travel, but “down” is in vogue. Nature has its “sacred depths” (Goodenough 1998). We stand on holy ground. Earth is the ground of our being. Even Stephen Jay Gould, after a career advocating contingency in natural history, closed his massive paleontology text, among the last words he wrote, calling call the Earthen drama “almost unspeakably holy” (Gould 2002, 1342). Watching Earthrise from the moon astronaut Edgar Mitchell was deeply moved by the “sparkling blue and white jewel ... rising gradually like a small pearl in a thick sea of black mystery” and continued that his view was “a glimpse of divinity.”

There is creative transformation; but not creative transcendence. Or even allow that nature is self-transcending. Only keep that a lowercase *t*: transcendence, not Transcendence. If the “over” direction seems uncomfortable, then try “behind” or “beyond.” Those who hope to be scientific about answers will say that even if science does not give all the answers we might like about escalating, serendipitous nature, we should still be naturalistic.

With the evolution of each later stage, the tectonic potential of nature actualizes into something higher. Posit lots of emergence, opening up of new possibility spaces; make Earth, with Popper, a world of propensities. But keep it immanent.

Recall here that metaphysicians have long argued that if you go deep enough, immanence is transcendence. To go down to an energy pit beneath the Higgs bosons and the quarks, out of which all bubbles up, radically transcends any form of reality that we know at our native ranges. A quantum fluctuation in a vacuum that explodes and suddenly inflates into a universe – this quite transcends common experience. You can get beyond by going beneath as readily as by going up and out.

Nature warrants the kind of respect, awe, reverence, love, devotion formerly reserved for God. Some naturalists may complain that to add a transcending God diminishes the natural creativity. In a kind of metaphysical zero-sum game, any points we give to God have to be subtracted from small pearl Earth. If you praise God, by just that much you celebrate nature the less. Vice-versa, when nature scores many points, God loses points. Give nature all the points and God isn't in the game any more.

Or, you can, if you like, let Nature, Super be God. Gordon Kaufman, Harvard Divinity School, reached the conclusion that God is a human symbol which can now best be understood as referring to the “serendipitous creativity” appearing in the natural world (Kaufman 2001). This does not mean that a transcendent God is in, with, and under the remarkable creativity in nature. “God” just is that serendipitous nature, nothing more, but that much is quite exciting. This is a more appropriate description of what we have classically referred to as “God” than such traditional concepts as creator, lord, and father. Today these latter metaphors can only be seen as heir-looms, treasured perhaps, but no longer seriously functional in the light of modern science.

Stuart Kauffman advocates *Reinventing Religion* in this naturalistic form. The trajectory of the “nonergodic” (non-repeating) universe is continually taking it into the “adjacent possible,” a configuration space whose possibilities cannot be foreseen in advance. Again, in serendipity, new things emerge that cannot be adequately described by existing categories. No algorithm or logical deduction can completely explain the present, much less the future, and we have to learn to live with mystery creatively. At the current apex of such creativity, we humans ourselves are co-creators of the biosphere and global community, escalating this mystery. The creativity of nature “is stunning, awesome, and worthy of reverence. ... God is our chosen name for the ceaseless creativity in the natural universe, biosphere, and human cultures.”

Kauffman hopes to recast religion with the “view of God as the natural creativity in the universe” (Kauffman 2008, xi, xiii).

But monotheists continue to worry: The cash value that venerating serendipitous creativity leaves for believers to take home is: “God is gone! May the Force be with you!” Is there anything that lies behind, beyond such ceaselessly creative phenomenal nature that provides a more ultimate explanation and meaning? When nature evolves spirit, one might need some form of spiritual explanation. Well, say the naturalists, what you find is a spirited nature. So let’s recall the story: With humans, nature gets more into spirit, and do we have adequate “naturalistic” explanation for that? Certainly not if “naturalistic” means “scientific” because there is no set of sciences that predicts or retrodicts the natural history from Big Bang to Einstein, from quarks to Jesus.

Elliott Sober, well known philosopher of science, puts the point provocatively, claiming that sciences cannot avoid some belief in the supernatural. This is because they must use numbers and number theory, evidently in physics but also in evolutionary theory (as in statistics and probability). But numbers and numerical truths (such as the Pythagorean theorem, or those proofs in prime number theory), according to most mathematicians, are not natural entities, not empirically discovered, but trans-scientifically true, rather like Platonic entities. He then asks, “If numbers, why not God?” (Sober 2011, 121–52).

An escalating experience encountering nature is that the story is already incredible, progressively more so at every emergent level. The story is quite fantastic, except that it is true. To take most recent evidence, Lawrence M. Krauss, Director of the Origins Project at Arizona State University, concludes that the discovery of the Higgs particle (requiring vast genius in mathematics) “makes even more remarkable the precarious accident that allowed our existence to form from nothing – further proof that the universe of our senses is just the tip of a vast, largely hidden cosmic iceberg.” “Most significantly perhaps, cathedrals and colliders are both works of incomparable grandeur that celebrate the beauty of being alive” (Krauss 2012, D2). At this turn of thought, monotheists may want still deeper explanations: a Transcendence in which this self-transcending nature is embedded, a Ground of all Being.

Supercharged nature signals Transcendent Presence. The upper-level accounts cast their light back across what might in short-scope perspective have seemed complete naturalistic accounts. They cast shadows over them. The earlier events begin to figure as subplots within a larger story. Afterward, the naturalistic explanations do not look so compelling, as they earlier did. To believe in the supernatural is to believe that there are forces at work that transcend the physical, the biological, the cultural. These spiritual forces

sway the future because they have for millennia been breaking through and infusing what is going on. This detects from our present vantage point intimations of a fourth dimension (Spirit) when three dimensions (matter, life, mind) are already incontestably evident and the fourth is secretly and impressively also at work.

7. Presence: Persons and Beyond

Presence is the miracle – rare but undeniably here – and revealing of the whole. Science tends to feature the primacy of matter-energy, but theologians reply that the primacy is in experiential presence – that is what is primarily to be explained. The one indisputable fact is that “I am.” How can it come to be that matter-energy results in persons with such presence? The deepest and most plausible answer is Presence, subtending Presence, at the start up and en route. (Recall the Hebrew: YHWH, “I am.” “I am present.” *Numinous Presence.*)

When seeking explanations, especially historical explanations, to work backward is often as plausible an approach as it is to work forward. In the sequence $A \rightarrow B \rightarrow C$, perhaps A causes (and explains) B, but C explains (the heading of) B as well. The Pilgrims landing at Plymouth Rock were driven from Europe; they were drawn by a vision of a New World, America. Matter causes life causes mind. But perhaps mind illuminates the potential of matter, perhaps in the outcome we detect subtending Mind (as Thomas Berry was suggesting).

We cannot doubt that in ourselves there is “somebody there,” spirited presence. That there is a trans-cosmic personal God is, so it seems at the start, almost utterly irreconcilable with anything known in cosmology – the bare matter-energy that stares astronomers in the face. But when astronomers stare in the mirror (their shaving mirrors, not their mirror telescopes), seeing their faces, they may pause to think that this matter-energy creatively produced persons – and wonder if that result is not as revealing as dark energy or Higgs bosons.

Yes, at such levels of complexity, we will often be in “over our heads”; but one conclusion is inescapable: what is “in our heads” is as startling as anything else yet known in the universe. We will be left wondering how far what is going on “in our heads” is a key, at cosmological and metaphysical levels, to what is going on “over our heads.” Is mind a key to the whole? Are we detecting Mind in with and under it all? Are we an icon of deeper Presence, Spirit suffusing the universe story?

Our own inwardness is not easily subject to scientific study, many think not at all subject to objective science. So perhaps the place to begin is with the revelations in contemporary neuroscience, which, though facts of the matter, do a lot of pointing beyond. J. Craig Venter and over 200 co-authors call the human brain “a massive singularity” (Venter et al. 2001, 1347f). A team of neurogeneticists conclude: “Human evolution is characterized by a dramatic increase in brain size and complexity” (Dorus et al. 2004, 1027). Bruce Lahn, the lead researcher in the study, was interviewed:

We’ve proven that there is a big distinction. Human evolution is, in fact, a privileged process because it involves a large number of mutations in a large number of genes. ... To accomplish so much in so little evolutionary time – a few million years – requires a selection process that is perhaps categorically different from the typical processes of acquiring new biological traits. ... It required a level of selection that is unprecedented. Our study offers the first genetic evidence that humans occupy a unique position in the tree of life. (Lahn, interviewed in Gianaro 2005)

Michael Gazzaniga, a neuroscientist, speaks of “the explosion in human brain size”: “We are hugely different. While most of our genes and brain architecture are held in common with animals, there are always differences to be found ... the differences are light years apart. ... We humans are special” (Gazzaniga 2008, 13, 1–3).

The human brain is of such complexity that descriptive numbers are astronomical and difficult to fathom. A typical estimate is 10^{12} neurons, each with several thousand synapses (possibly tens of thousands). Each neuron can “talk” to many others. The postsynaptic membrane contains over a thousand different proteins in the signal receiving surface. “The most molecularly complex structure known [in the human body] is the postsynaptic side of the synapse,” according to Seth Grant, a neuroscientist (quoted in Pennisi 2006). The human brain is capable of forming thoughts numbering something in the range of $10^{70,000,000,000}$ thoughts – a number that dwarfs the number of atoms in the visible universe (10^{80}) (Flannagan 1992, 37; Holderness 2001). On a cosmic scale, humans are minuscule atoms, but on a complexity scale, humans have “hyperimmense” possibilities in mental complexity (Scott 1995, 81). In our hundred and fifty pounds of protoplasm, in our three-pound brain is more operational organization than in the whole of the Andromeda galaxy.

The human brain is not just a scaled up version of chimpanzee brain. Humans are remarkable in their capacities to process thoughts, ideas, symbolic abstractions figured into interpretive gestalts with which the world is understood and life is oriented. The key threshold is the capacity to pass ideas from mind to mind. “Humans have a whole system that we call theory

of mind that chimps don't have" (Daniel Povinelli, quoted in Pennisi 1999, 2076). Carl Zimmer concludes:

"Of all the species on Earth, only humans possess what researchers call a 'theory of mind' – the ability to infer what others are thinking. ... After decades of studies, no one has found indisputable signs that chimps or other nonhuman primates have a theory of mind." "Understanding that others think is a human exclusive" (Zimmer 2003).

Humans can enjoy an epistemic genius, transcending their own sector and take an overview (Earth seen from space, the planet's hydrologic cycles, genes which they share with, or that distinguish them from animals), or take in particulars outside their embodiment (sonar in bats, low-frequency elephant communication), or consider transcendence (in mathematics and theology). We can, as we are doing here, consider whether the origin of the universe, the origins of life, and the origin of mind, billions of years apart and spanning immense levels of complexity, are inevitable or surprising. This genius is fact of the matter. If science could find that this result is latent in the system, that would be a great marvel. If, rather, science can only find that this outcome a serendipitous surprise in the system, that makes it no less a marvel. Either because of or despite their evolutionary origins, humans are a radically new kind of species on Earth.

Life starts up, and, on some of its trajectories, it smarts up. That is as startling in the super-smart human-head-start as anywhere else in the universe. Again, one can say that the primates just got lucky. But one can also wonder if this creative genesis in natural history requires deeper explanations. Chemical reagents remain effective in human biochemistry, but spiritual agency, superimposed on this, is a radically new level of being. We find in persons an agent who must be oriented by a belief system, as, in the biological world, animals are not.

That leaves us with the question of how to authorize such a belief system. In nature scientists find facts of the matter; in culture one needs guidance that is not fact of the matter either in nature or culture. We humans must make religious choices confronting all of occurrent reality: culture as well as nature. The grand narrative, the storied history, produces persons, not just *Stegosaurus* but Mother Teresa. Acting as spirit, I need an account of evolutionary history, I also need to know whether to be just, charitable, whether and when to forgive sins. Now the is/ought problem emerges urgently, and, impressive though it is, escalating nature offers little help.

In persons, the self-actualizing and self-organizing doubles back on itself with the qualitative emergence of what the Germans call "Geist," what existentialists call "Existenz." Matter can, the physicists say, be "excited" under radiation. The neural animal can, the biologists say, become "excited," emo-

tional. Here, what is really “exciting” is that human intelligence is now “spirited,” an ego with felt, psychological inwardness that cares about itself and its role in the world.

Persons have egos. They feel ashamed or proud; they have angst, self-respect, fear, and hope. They may get excited about a job well done, pass the buck for failures, have identity crises, or deceive themselves to avoid self-censure. Humans are capable of pride, avarice, flattery, adulation, courage, charity, forgiveness, prayer. They may resolve to dissent before an immoral social practice and pay the price of civil disobedience in the hope of reforming their society. They weep and say grace at meals. They may be overcome with anomie, or make a confession of faith. They may insult or praise each other. They tell jokes. Persons act in love, faith, or freedom, driven by guilt or seeking forgiveness – to use categories that theologians have thought fundamental.

Persons have unique careers that interweave to form storied narratives in cultural heritages. They have heroes or saviors, who may die for the sins of the world, launch the Kingdom of God, or launch other passionate ideologies about the meanings of life and history. Persons may become disciples of these sages and saviors, and when they do they realize that to be a person includes a dimension of “spirit.” Where there is reflective, sacrificial suffering love, there is spirit. There is spirit where there is sensing of the numinous, the sacred, the holy. There is spirit where there is awe, a sense of the sublime. There is spirit where, along with an explosion of knowledge, nature escalates as a wonderland. There is spirit when persons confront the limit questions, when persons get goose pimples looking into the night sky or at the Vishnu schist at the bottom of the Grand Canyon.

The singularities, if we may use a theological word, might also be “revealing” not simply about human spirit but about divine spirit, about “Presence.” Science gives us three principal data points: matter-energy, life, and mind. The first is universal; the second is rare; the third is single and we are it. Surveying this trajectory from nature to spirit, we will wonder whether these three phenomena, radically emergent, are all somehow front-loaded into the system, or whether each is a one off surprise. Surprises too can be revealing about what is going on, beneath the surface.

Einstein concluded, famously, that “the eternal mystery of the world is its comprehensibility” (Einstein 1970, 61). Going beyond Einstein, I incline to add that “the eternal mystery of the universe is its generating of comprehending mind.” In this sense, the astronomical, the mathematical, the evolutionary, the genetic, the neurological, and the psychological events all suggest that rational minds may well believe that we inhabit a “spiritual” uni-

verse. We can wonder if there is a “Logos” in, with, and under the logic of such nature. Maybe we are not so lonely after all; our presence is embraced by another Presence.

Almost anything can happen in a world in which what we see around us has actually managed to happen. The story is already incredible, progressively more so at every emergent level. Both good induction and good historical explanation lead us to believe in surprises still to come and powers already at work greater than we know. For all the unifying theories of science, nature as a historical system has never yet proved simpler or less mysterious than we thought; the universe has always had more storied achievements taking place in it than we knew. To detect the work of spiritual forces, *Presence* beyond Force, is not, in this view, to be naive but rather to be realistic. Anything less is myopic.

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