

## Divine Action and Teleology in an Evolutionary World

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**In this paper I explore three possibilities: 1) whether or not there is room for divine action in a dynamic, undetermined, evolutionary world; 2) if divine action is necessary to explain the outcome of creation; and 3) if there is purpose (e.g. teleology) in such a world. I will address the implications of indeterminacy, parts-and-whole behavior (or emergence), and directionality for divine agency. Models of God's action informed by these trends will be provided. Finally, I will explain the teleological implications of these discoveries and God's action and conclude with implications to the Christian faith.**

Darwin's research and theory of evolution via natural selection did more than just challenge the scientific community. It challenged common thought and practical theology; before, people generally believed that God created the world exactly as it was always meant to be. Plants, animals, and most importantly mankind, were all designed, ordained and as God intended from the beginning. But even if geological and biological evidences showed that the world was dynamic and changing, the belief that man was created fixed in God's image was held sacred. If species evolved from a common ancestor, did God have any creative say in the world? If so, what could that look like?

Later, in the twentieth century, quantum non-linear physics took the stage. Much as Lyell and Darwin challenged fixed geology and biology, the new physics challenged the static view of Newton. While Newtonian physics was able to explain macro-systems and patterns in the universe, quantum physics revealed that the core of these behaviors were random. In order to predict anything using Newton's laws, one needed to know the initial conditions; but quantum physics explained that the nature of electron interactions made that impossible. It would

seem that the epic of nature was driven by indeterminate processes with little to no indication of a blueprint regarding how things ended up the way they are.

Given the above, the questions this paper seeks to address are: is there room for divine action in a dynamic, undetermined, evolutionary world? Is divine action necessary to explain the outcome of creation? Is there a purpose (e.g. teleology) in such a world? First, I will address the implications of indeterminacy, emergence, and directionality to divine agency. I will then provide models of God's action informed by these trends. Third, I will explain the teleological implications of these discoveries and God's action. Lastly, I will conclude with implications for the Christian faith.

### Indeterminacies

The challenge of both quantum physics and evolutionary theory to a deterministic way of thought is that the universe is full of examples of uncertainty and multiple possible outcomes. The discovery and development of quantum theory showed electrons to have both particle and wave-like properties, and while, separately, those can be measured and their effects predicted, together it is impossible to pinpoint the

position and velocity of an electron at any given moment. The best that can be done is a probability distribution; a probability that is unsatisfactory in light of the exact and deterministic answers previously expected with Newtonian physics.<sup>1</sup>

This phenomenon of indeterminacy also occurs through evolution (but let's be quick to point out that this is not due to reducing biology to physics). There is a dynamic progression of a changing universe from its origin until now, and as life in it becomes more cooperative, the system grows less chaotic, more complex and more stable; yet the chance for novelty increases, and all without violating second law considerations of thermodynamics.<sup>2</sup> When it comes to evolutionary systems being built, we wonder why any particular outcome is more likely than another. Accident and happenstance does not seem to be a sufficient answer. But neither does interference – divine or otherwise.

These observations have multiple possible explanations. It is possible that there is a gap in our knowledge of the universe, and as we discover more, we will find the missing piece to our understanding; the world may no longer appear to be indeterminate. Another option is that our perspective cannot adequately grasp the nature of reality. We assign meaning and make models to describe the phenomena we see in the world; even by describing an electron as both a particle and a wave, we admit that our ability to describe fundamental aspects of reality is limited due to the metaphors we use and the understanding we have. A final option is that the indeterminacy observed in the universe is exactly what it appears to be: indeterminacy. There are some things that

cannot be predicted, with or without the initial conditions.<sup>3</sup> As there is no empirical way to confirm the first two options, it is simpler and more likely that the third is a valid and understandable way to move forward in scientific thinking.

### **Emergence and Top-down Causality**

Another startling observation about the higher-organization of the universe is that the behavior of a whole system is not merely the sum of its parts. With respect to the components of an atom, the Bohr model describes it as a miniature solar system, a nexus of protons and neutrons orbited by electrons. However, protons themselves are made of quarks – scientifically elusive particles because they cannot exist alone. As soon as one is separated, it joins with others or creates others with which to join.<sup>4</sup> This kind of behavior is not seen in higher organizations of chemical compounds. But as molecules combine and become more complex, the way they interact changes, allowing for emergent levels of organization and complexity.

A second example of intractable emergent behavior is the process of biological evolution. Evolution is not the product of natural selection alone. Not only do genetic recombination and mutations occur, but there are several other factors that affect speciation. Epigenetic effects, environment, and organismal behavior all contribute to the system of change in a species. The interaction between the changing organism and the changing environment is called the Baldwin effect – as a system puts pressures on an organism, the organism pressures the system and changes it as a result.<sup>5</sup> In this example we not only have the concept of emergence where wholes are more than the

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<sup>1</sup> Barbour, 1997.

<sup>2</sup> Brooks and Wiley, 1988.

<sup>3</sup> Barbour, 1996.

<sup>4</sup> Barbour, 1997.

<sup>5</sup> Barbour, 1996.

sum of their parts, but we also have a case of top-down causality where the whole comes back to affect the very parts of which it is made.<sup>6</sup> It is impossible to predict the future course of evolution due to the indeterminacy that is the result of an open system. While we understand the mechanisms behind speciation and how laws govern it, we cannot account for all the factors acting on the system and therefore cannot predict its outcome.<sup>7</sup>

### **Directionality despite Happenstance**

Even though the future is unpredictable, it does not exclude the possibility of directionality in the universe.<sup>8</sup> From the beginning of time, laws start to come together to govern the direction in which the universe develops. The universe cools, allowing particles to come together. Gravity and magnetic fields start to pull solar systems into place. Particles combine to form water and proteins. These molecules self-replicate, and, slowly and inextricably micelles form, RNA catalyzes replication of itself, information is retained, enzymes form ... life begins. Organisms become goal directed, changing the way they interact with their environment. The central nervous system becomes increasingly complex, allowing for consciousness. Conscious organisms organize further and form societies with moral codes. The epic of time is an entire demonstration of how higher complexity is achieved through the random selection of some laws over others. This bottom-up effect drives systems to be more complex and more novel, making evolution

of similar systems inevitable but indeterminate. Because some laws exist, the universe developed this way. Every option was random, but the outcomes are completely explainable even if unpredictable.

Some examples that writers give to illustrate these principles include the development of proteins and speciation. Protein folding demonstrates self-organization due to the fundamental laws of physics; amino acids naturally have affinity for each other, and their chemical behavior at the linear level leads to greater complexity and three-dimensional structure depending on its environment.<sup>9</sup> Speciation is another example about how something as basic as the genetic code can influence complex forms of behavior. That behavior in turn influences the organism's development, which (paired with the stressors of its environment) can affect survival, mutation rates, choice of habitat, and the continuation of the species.

### **Potentialities for Divine Action**

These characteristics taken together – indeterminacy, emergence, top-down causality and directionality – oust the need for continual divine intervention according to neo-Darwinian thought. Science has assembled a narrative to explain how the universe arrived at its current state, and miraculous acts of God – as in violations of natural law – are not needed (and would be empirically untestable, anyway) to fill in the blanks. If anything, one can always resort to the explanation that God established these

one-off event (we are here) and seems to reflect confirmation bias (his particular religious views see humans as necessary for God's purposes).

<sup>8</sup> William Stroeger (1996) gives this account in more elegance and detail in his article, *Immanent Directionality of the Evolutionary Process, and its Relationship to Teleology*.

<sup>9</sup> Davies, 1996.

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<sup>6</sup> Juarrero, 2014.

<sup>7</sup> Stephen J. Gould (1989) made this same claim when he used the metaphor of a video tape NOT ending the same way when it came to understanding the evolution of life. In what seems to be a rebuttal, Simon Conway-Morris (2008) claims that convergent evolution will always lead to an optimum body plan and thus humans were inevitable to occupy a "human niche." Unfortunately, the argument is based on a

laws of self-organization, as described above, to allow the cosmos the complete freedom to become on its own rather than forcing it to do His will. However, these laws that organize parts into more novel, more creative wholes are fragilely kept in balance. Randomness, despite its creativity, is an insufficient explanation for their sustainability. Paul Davies explains why he considers this balance necessary in order to point to the need for a divine sustainer: it does not seem logical to say law and rationality emerge from total happenstance. Furthermore, these laws themselves are consistent through time; this is a kind of eternity that an eternal God could sustain.<sup>10</sup>

### **Open Theology vs. Determinism**

The challenge that this paper has addressed so far is directed mostly at determinism, which was the primary view of God before Darwin. Determinism, when describing God's sovereignty, is an Augustinian view; it holds that God is not God unless he can do whatever he wants.<sup>11</sup> A faith informed by this belief would have trouble explaining the inconsistencies, disasters, and chaos of the universe, because it would hold God accountable for every action. This is troubling from both a scientific and theological perspective. Every bit of nature would be his decision. Consequently, He would be culpable for every natural evil as well. How could an indeterminate creation reflect an ordered God? Or, stated in blunt theodicy terms, how could a good God be sovereign over a violent and devastating cosmos that destroys nearly all of its species

on a single planet even before humans appeared within it?<sup>12</sup>

In contrast to determinism, open theology is appealing in that it at least offers an alternative explanation of God's sovereignty that respects free action for the entire cosmos. What if God in nature was resourceful and persuasive instead of coercive?<sup>13</sup> God made a universe that is dynamic and changing, and not every decision is under his control. He relinquished some of his sovereignty by giving his creation agency. By giving up his power to be responsible for every action, he gets to be in relationship with his dynamic creation – he can experience it with us.<sup>14</sup> With this view of God's sovereignty, there are different implications on divine agency. God is now free to work (and be sovereign) in a world that is wildly unpredictable.

### **God and Indeterminacies**

With this new perspective on God's action in the world, we are open to a realm of possibilities of ways he could act. With indeterminate outcomes especially, it would be possible for God to have agency with no scientific anomaly or miraculous act necessary. Divine action could fly completely under the radar under the cloak of probability. Several different scientists have hypothesized how this could look.

William Pollard asserted that God could have total control of the universe at the quantum level, determining every event from the bottom up. The critique of this argument is that it reduces God to work only at the atomic level with a predestination

God's image) understanding. See Southgate (2011) for a much more nuanced presentation of this idea.

<sup>13</sup> This view of God is more feminine than masculine. We have been using the masculine pronoun but the feminine would be just as appropriate. See Oord (2010).

<sup>14</sup> Pinnock, 1996. Pinnock succeeds here but theodicy questions still abound. See Oord (2010).

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<sup>10</sup> Davies, 1996.

<sup>11</sup> Pinnock, 1996.

<sup>12</sup> This would include the five major mass extinctions including the Permian where a staggering 96% of species were wiped out. These kinds of events speak against the concept of God directing such tragedies. At least they do not make sense to human (made in

mindset.<sup>15</sup> Another theory of how God's action could work through indeterminacies is Robert Russell's "non-interventionist view of objective special providence," which holds that quantum mechanics could be manipulated to direct evolution by acting at the atomic level in genes.<sup>16</sup> That would give God power to direct the evolution of species, which could partially explain the rise of consciousness and morality in humans. If God could be active in the hydrogen bonds that hold DNA together, he could also be active in other chemical processes in the body, potentially even in neural pathways. Could God have awakened our awareness of him through such methods? Could divine inspiration be a literal flick of the quantum wrist that spins our thoughts toward the divine?

These theories hold a spectrum of assumptions on the degree to which God acts in the world, but the base of their arguments is the same: God can act *within* the laws of nature.<sup>17</sup> Indeterminacy does not cut out the possibility of divine action; it welcomes it to the table. Another common thread is that this intervention would be unintelligible to our observation. If God works in this way, we can't tell the difference, but at the very least there is space in these indeterminacies for him to have agency and still be within the bounds of physicalism. And, it still leaves us with mystery.

### God and Emergence

With the possibility of God working at the basic level of reality in atoms, one can start to piece together how the universe works differently at different levels. The behavior at the atomic level does not mirror the

behavior of larger, more complex systems. Because of these many layers of reality, it would not make sense to limit God to the bottom level of activity. If God asserts agency, and God created the whole system of the universe, then why limit God to just one level of action?

Arthur Peacocke has written much about how God can interact with the universe as a complete system.<sup>18</sup> Within the layers of organization, there is a great deal of interdependence and communication. Peacocke argues that God can act holistically on the world-system in its entirety, asserting omniscience to do what he intends. The world can be visualized as being in God, but God is clearly separate in his existence. The world is dependent on God – the sustainer – but it is important to point out that this interaction is more like a community than a mind-body interaction.

### God and Directionality

The bigger picture of all these options of God's agency is that the laws observed in nature are self-organizing. God set into motion laws that were capable of creating the complexity evident in the universe. The extreme position in this line of thinking is to say that God set everything into motion and then left (deism); on the other hand, we can say, with the considerations above, that there is room for God to act. From what we surmise of God, it would make sense of him to act in relationship with his creation. The last consideration is if this interaction is purposeful.

### Teleology

Considering the possibility of God acting in the universe leads us to wonder about his

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<sup>15</sup> Barbour, 1997.

<sup>16</sup> Russell, 1996, p. 193. For a critique of Russell's idea, see Saunders, 2002.

<sup>17</sup> Tracy, 1996. This provides a more complete look and critique of the spectrum to which God can act in an undetermined world.

<sup>18</sup> Peacocke, 2001.

intentions – is there a blueprint? Was the universe intended to turn out this way? As Peacocke has mentioned in his work, it would seem that a relational God would have some preference in how he interacted with his creation.<sup>19</sup> It is important at this point to make a distinction between teleology and the meaning of life; answering the former will not necessarily lead to the latter. Also, questions of purpose cannot be answered by science alone, but we can look to science for support regarding whether the creation reflects intention or is merely a consequence of randomness in the cosmos. One way that scientists have engaged this question is by first asking if the universe has had directionality in its development.

Writers on this topic have the same foundational scientific observations:

1. The world naturally has self-organizing principles, leading to law-like behaviors at the macro-systems.
2. The complexity of those macro-systems is due to the indeterminacy of the universe in the micro-systems, and amazingly, those macro-systems do not behave as the sum of their parts.
3. These two givens in the universe bring about spontaneous novelty and continuous creation in a dynamic world.

Given these points, scientists begin to diverge on the issue of whether these observations necessitate a need for a creator to direct the process toward a desired end. Paul Davies argues that this behavior is a natural order that allows the world to develop as we know it today without any divine intervention, therefore any perspective of teleology is limited.<sup>20</sup> God chose self-organizing laws and had no need

to direct the random outcomes, but accept them as his creation as they emerge. The need for purpose in directionality is illusory. William Stroeger argues that because directionality is inherent to the universe, as laws of physics and universal trends emerge, the possibilities are refined but also make way for novel and increasingly complex systems to emerge. In this way, directionality is inevitable, but impossible to predict.<sup>21</sup> The indeterminacies in nature make it impossible to find a blueprint for the way life is supposed to be, and we cannot know by scientific observation whether God is present in micro-levels directing the process, but that does not make teleology irrelevant. Stroeger argues that teleology is a result of a system realizing its potential as it evolves in complexity, leading to end-directed – but not goal seeking – behavior. From this perspective, even natural disasters have a purpose that do not go against a good God and a good creation. Natural disasters interrupt directionality; they level what was organized before, and in doing so, allow opportunities for more creation to become.

### **Conclusion: A Christian Application**

Unfortunately these explanations of purpose are wanting in terms of definitiveness. Questions about the meaning of life cannot be answered by science, but are met with three subtle clues – our existence is somehow spontaneous, somehow sustained, somehow inevitable. Informed by faith, the observations I have delineated in this paper have a more expanded meaning and potential than they do in purely secular views. The natural world reveals there is room for a God we cannot empirically know – faith fills in the blanks of what the implications are for a God who is relationally invested in creation.

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<sup>19</sup> Peacocke, 2001.

<sup>20</sup> Davies, 1996.

<sup>21</sup> Stroeger, 1996.

So what does divine agency mean for those who are looking for evidences of God's actions? For Alister McGrath, the world may *seem* meaningless; yet this is because we do not see it in the right way. If it seems hopelessly out of focus and disorganized, it is because we have yet to find the key to bringing it into focus and weaving its seemingly disconnected and unrelated threads together into a tapestry of meaning. Christianity provides a framework of meaning which illuminates the shadowlands of reality, brings our observations of the

world into focus, and weaves the threads of our experience into a pattern.<sup>22</sup>

The significance of indeterminacy and complexity in the world is that there is room for divine agency. Creation is not stagnant, and God is engaged in it with intentions that are beyond us. What a thrilling hope and prospect to look at creation as in progress. God is still with us.

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<sup>22</sup> McGrath, 2011, p. 104.