Two Interlocking Stories: Job and Natural Evil and Modern Science and Randomness



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In the book of Job, we find a righteous and puzzled sufferer, a victim of evil brought on by other humans and by the forces of nature. Job demands answers to his suffering, screams at God for justice, and receives a surprising response: a Voice from the whirlwind challenges him to carefully consider certain aspects of the created order. Our thesis is that Job is wrong in his belief that creation reflects the retribution principle (RP). We maintain that the text indicates that God created through wisdom and power, but that the RP is not a promised part of God's excellent handiwork in the cosmos and our earth. We explore some consequences of there being no RP in creation, including natural evil, limited randomness in physical processes, the suffering of creation itself (including all living creatures), the ability of the living creation to adapt to environmental changes, and the opportunity for humans to emerge on Earth some 13.8 billion years after the Big Bang.

• he biblical book of Job recounts a man described to be, as we read in the very first verse, "blameless – a man of complete integrity, "1 and one who was very rich in every wayin possessions, family, and health. God allows the challenger (the satan) to test Job within limits (1:12, 2:6).² Calamity strikes quickly: Job's farmhands and animals are killed and stolen (1:14-15), a fire from heaven burns up Job's sheep and shepherds (1:16), Chaldean raiders steal his camels and kill his servants (1:17), a powerful wind sweeps in from the wilderness and collapses Job's house, killing his children (1:18-19), and later Job endures boils from head to foot (2:7). Job suffers grievously from both moral evil inflicted on him by people and physical (or natural) evil inflicted on him by creation.

Job's attitude progresses – at first he calmly accepts his losses (2:8–3:26), but later he insists that he has been treated unfairly, a conclusion he reaches after receiving unhelpful and inappropriate counsel from four friends (4:1–27:23 and 32:1–37:24).³ Job then screams at God, demands a hearing, and asks for justice. Both Job's friends and Job strongly believe that the universe operates under

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the retribution principle (RP)-the idea that the righteous will prosper and the wicked will suffer.⁴ Since Job has suffered greatly, these friends conclude that Job has sinned. Knowing that he has not sinned, Job rejects their conclusions and counsel. However, Job also believes in the RP, and surmises that God is exhibiting injustice by not acting consistently with the RP. Job declares his innocence and blames God for allowing undeserved suffering to befall him, claiming that he has been treated unjustly (28:1–31:40). Even though Job's monologue appears several chapters before the speeches by the Voice in the storm, it is thought by some that this section should directly precede the Voice's speeches in Job 38-41.⁵ When we get to the Voice's speeches, we encounter two significant surprises: first, God (the Voice) responds to Job out of a storm; and second, God completely contradicts Job's working assumption of the validity of the RP.

God, as the Voice in the storm, opens his response to Job (38:1-3) by making a single criticism of Job: God says Job is ignorant and asks, "Who is this that questions my wisdom with such ignorant words?" (38:2). Commentator David Clines suggests that the Voice's tone is severe and not at all gracious, yet not offensive and not cruel.⁶ John Walton writes that speaking from the storm signifies God's wrath directed at Job and indicates rebuke.7 In the speeches, God's intention is to make his design plan for the universe (38:4-7) clear to Job, and God does this by teaching him aspects of creation, mainly through examples stated in terms of rhetorical questions.8 By doing so, God wants to point out to Job the wisdom of the divine strategy in planning, creating, and overseeing the operation of the world. God does this by referring to the created order alone-to properties of the physical world (38:8-38) along with selected examples of animals and birds (38:39-41:34). From these references, God expects Job to deduce the principles by which he designed, created, and maintains the world, but God leaves those core principles unspoken. By describing his divine strategy in this way, God demonstrates patience and accommodation toward Job.9

This article consists of two parts. In the first part, we will explore Job's suffering, concentrating on the aspects of creation related to the natural evil that Job suffered, evil that has its origin in natural

processes. Like Job we will ask, doesn't the RP apply to creation? Doesn't God's justice demand that a person like Job not suffer from natural causes? We will also ask a further question: How can God's justice exist alongside a world of suffering caused by natural processes such as earthquakes, floods, and storms of all kinds; devastating illnesses; birth defects; nature "red in tooth and claw"; and the physical death of living things throughout creation, including the death of humans? Understanding God's wise strategy for creation is a key step in dealing with natural evil. Job's understanding was limited and inadequate before the Voice addressed him, but for Job, and for us as twenty-first-century believers, the hope is that through the speeches God's strategy can be determined and his creation wisdom can be made clear.

Our thesis is that Job makes a faulty assumption when he assumes that creation reflects God's wisdom, power, and the RP. We maintain that the speeches indicate that God created through wisdom and power, but that the RP is not a promised part of God's excellent handiwork in the cosmos and on our earth. In the second part, we will focus on randomness as a key aspect of natural evil and the role that randomness plays in natural processes. We maintain that randomness plays a crucial role in carrying out God's creation strategy, but sometimes brings harm and suffering to parts of the created order-and in a somewhat indiscriminate way-both to humans and the rest of creation. Finally, we will suggest some implications for followers of Jesus as they seek to respond and minister to victims of natural evil.

Job 38–41: The Voice in the Storm

The Voice delivers two speeches to Job. After introductory remarks (38:1–7), the first speech (38:8–39:30) contains seventeen stanzas: the first ten refer to physical features of the world, and the next seven give short descriptions of nine animals and birds. The second speech (40–41) contains lengthy descriptions of the Behemoth and the Leviathan. The following is a summary of these four chapters, focusing on features of the speeches related to natural evil.

Following the Voice's initial statement to Job (38:1–3), God describes the structure of the world

(38:4-7), in which God claims high skill and competence in planning, constructing, and continuing to manage and nurture his creation in a consistent and wise way. God created everything with a purpose, but many of his purposes do not directly relate to humans. There is no evidence of anything unplanned in creation-no surprises for God-and no indication in the speeches that anything needs fixing. God knows his creation very well, for he has planned and measured it and has a purpose for each aspect. In short, God has displayed wisdom, competence,¹⁰ power, and care in planning, carrying out, and continuing to uphold creation. God's wisdom in creation is seen in other places in the Bible (e.g., Prov. 3:19; 8:27-29; Pss. 104:24; 136:5; Jer. 10:12). It is informative to note the Jeremiah verse,

- But God made the earth by his power, and he preserves it by his wisdom.
 - With his own understanding he stretched out the heavens.

Both Walton and Tremper Longman III conclude that God, in Job 38, expresses his control of creation, demonstrating power and wisdom, but not justice.¹¹ God does this not only with the creation processes themselves but also through establishing organization and order.¹²

An example of God's skillful management is related to the seas (38:8–11). The sea can be dangerous, stormy, unpredictable, chaotic, and destructive for anyone. But the text indicates that God set boundaries that the sea cannot normally cross, resulting in the establishment of dry land. The unpredictable, random behavior of the sea has limits set by God, who has the power to do so, and yet we know that the sea is still dangerous, for both the sinner and the righteous person. The world's seas claim many victims each year.

In Job 38:12–15, the Voice declares that creation is renewed by God as each new day is created. This signifies the continuation of the creation process in a way that exhibits regularity and consistency, and hence makes the study of creation (i.e., science) a possibility. Science has a job to do, for the Voice points out the existence of the underworld and the realms of light and darkness (38:16–21), implying that there is more to creation than the eye can see. In exploring both the vast reaches of the cosmos and the invisible realm of the subatomic, modern science has shown that much about creation is imperceptible to our senses.

Job's understanding of the operation of nature is flawed, for he assumes that because God is just, the operation of nature must likewise be just. The next five stanzas (38:22-38) discuss aspects of the weather. God has created an eco-system that nourishes the earth and its inhabitants with all forms of water-rain, dew, frost, ice, and snow. If justice always prevailed in the cosmos, the blessing of rain would consistently target the deserving. But we read here that rain falls on uninhabited lands. And then there are the destructive effects of the distribution of water-floods (associated with torrents), tornados, other storms of many kinds, lightning strikes, tsunamis, tidal waves, blizzards, and east winds (implying destructive winds) are scattered over the earth. These destructive effects are indiscriminate, acting on sinner and saint alike. Is this justice?

These destructive effects highlight another aspect of creation—the suffering of creation that results from the way it has been planned and executed, starting in the beginning and continuing to the present. This aspect of nature is called natural evil and is clearly an intentional part of creation. In his speech, God indicates the natural evil that results from the destructive distribution of wind and water over the earth.

These verses imply a random aspect to a number of physical processes occurring on the earth. Yet, throughout scripture, we read the affirmation that God created (and creates) very well (Gen. 1:31, Job 38:4–7, plus others) and that the cosmos is continuously being upheld by the Son (Col. 1:17 and Heb. 1:3). We recognize that God controls the forces of nature, but agree with Walton when he suggests that God does not "micromanage the system with justice in mind for each moment's activity."¹³

The remainder of the first speech and the entire second speech is given to descriptions of certain birds and animals, eleven in all. Some of the animals described hunt prey to get food for their young; these serve as examples of blood and suffering in the world of living things. God is indicating that there is an order to creation. The natural order includes a food chain and involves innocent creatures

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suffering, resulting in blood and death in the hierarchy of animals and birds.

Natural Evil

The speech opens with the Voice responding to Job's accusation by declaring that Job does not know enough—and apparently Job does not know enough about creation and God's strategy for creation, for that is what the entire speech is about. We should also listen to God's message to Job, lest we miss important theological implications by ignoring creation. Our understanding of creation may be the key to understanding God's plan for creation, which in turn may be a prerequisite for understanding natural evil and the place that natural evil has in the overall plan God has for the cosmos.

What do we learn about creation and natural evil from God's two speeches to Job? We have several suggestions.

1. There is no hint of anything wrong with the universe or our world. Creation, including the animals and birds, seems to have come out as planned. God has created everything with a purpose. There is no hint of nature having fallen into sin. Creation has been organized well¹⁴ and reflects God's wisdom. God does not criticize creation.

2. Unfortunate things can happen to people, animals, and the environment because of the way the universe is, even though it is well planned and being upheld faithfully and wisely by God. God is powerful, wise, and just. But only his attributes of power and wisdom are exhibited in creation. Hence, it is possible that all people and all of creation may suffer because of the character of creation, suffering that is referred to as natural evil.

3. There are consequences of natural evil, primarily that creation suffers. Must creation feature natural evil, and hence suffering? Later in this article, we will explore the idea that our world would not have developed in the way it has, had the laws and physical parameters of the universe been anything other than what they actually are. Hence, natural evil may be a necessary aspect of creation.

4. There is lawful randomness in nature. This randomness is lawful because the universe operates under the laws of physics, chemistry, and biology. Weather, genetics, and disease are at least partly understood in terms of these laws, but there is also randomness at work, resulting in events that appear hit-and-miss because of our inability to predict their exact occurrences.

5. Nature has been given freedom to explore possibilities. This freedom is exhibited in the almost unfathomable diversity of life on our planet. Lawful randomness entrusts a degree of openness to natural systems and processes, enabling nature to develop novel forms and behavior that go beyond what one would expect from a strictly deterministic system. Some have said that God has given free will to humans to do good or evil, and that nature has also been given a certain dimension of freedom. In addition to lawful randomness, the possibility of miracles and answers to prayer are consistent with a universe that does not operate under completely deterministic principles. God shows his power not only by carrying out and upholding creation, but also by withholding his power in giving creation the freedom it enjoys. Kenosis is evident not only in the incarnation but also in these gifts of freedom.

6. God knows the universe and its life intimately.¹⁵ God knows all of the details—nothing about the universe is a surprise to God or threatens his overall purpose for the universe. In contrast, Job's knowledge is defective and incomplete. Our knowledge today may be far greater, but it still falls infinitely short of the intimate knowledge God has about all the worlds and creatures throughout the universe.

7. God's attributes of wisdom and power, but not his justice, are exhibited in his creation. Recall Romans 1:20a,

For ever since the world was created, people have seen the earth and the sky. Through everything God made, they can clearly see his invisible qualities—his eternal power and divine nature.

Throughout scripture, we see creation references to God's wisdom (Job 38:4–6, and others) and power (Rom. 1:20a, Isa. 40, and others), but there are no creation references to his justice in the Bible. Job was mistaken when he thought that creation should reflect God's justice, and he felt betrayed by God as a result of his mistake.

In summary, the Voice does not deny the existence of natural evil. Death, pain, and destruction play a prominent role in the two speeches. Natural evil and suffering are necessary consequences of God's carefully devised and very good plan for our universe and our world.

Randomness

We will next focus on the randomness apparent in the physical world, a feature routinely ignored when thinking theologically.¹⁶ The Voice showed Job a number of examples in our physical world that imply an inherent randomness, including the action of the seas, the weather, and the distribution of water over the earth. Do Christians have a bias against the idea of randomness being a part of God's plan of creation? Is it theologically satisfying to claim that God has ordained each detail of every physical event? Let us explore the nature of randomness and how it is clearly present in our physical world, a world that the Voice declares has been and is being created and upheld by God in a very good fashion. Through examples, we will observe the crucial role randomness plays in a number of physical, biological, and cosmological processes.

Randomness or chance essentially means unpredictability, whether the randomness is inherent (in principle) or simply a result of incalculability (in practice). Our universe is not totally random because the laws of nature put bounds on the behavior of every physical system and biological entity. Randomness, as we understand it, is a relatively new feature of contemporary science. Quantum theory, chaos theory, evolutionary biology, and many other twentieth-century developments have identified randomness as a key ingredient in natural processes.

We will now look at several examples of randomness in nature. Our first example is the radioactive decay of matter. Radioactive decay is well understood in terms of nuclear and electromagnetic forces, and physicists can model decay events using the microscopic laws of motion as given by quantum theory. The decay constant for a given radioactive nucleus can be calculated by applying its nuclear properties to quantum theory, which in turn leads to a specification of the half-life for that nucleus. For example, the half-life of Cesium-137 has been measured to be almost exactly thirty years. If we monitor any single nucleus of Cs-137, there is a 50% probability that the nucleus will decay at some time in the next thirty years. The problem is that the half-life is only a probability – we can say how likely it is that a nucleus will decay in a given span of time, but we cannot say exactly when that particular nucleus will decay. However, if we have 100 grams of Cs-137 with approximately 4×10^{23} nuclei, statistical theory lets us say with a high degree of certainty that after thirty years have passed, about 2×10^{23} nuclei will remain in that sample, with the other half of the nuclei having undergone decay.

In one sense, this is a random process. There is no way of predicting which of the nuclei in the original sample will decay in any given interval of time. Each nucleus in the sample has a 50% chance of surviving the thirty-year period. We know *how many* will survive, but we do not know *which ones* will be the lucky ones to survive.

It is much the same way in the life insurance business. Given a large enough sample of 75-year-old men, an insurance company knows fairly precisely how many of these will survive the next 365 days. In fact, the insurance company knows this number so well that it can make money insuring the lives of these men. The company knows how many, but not which ones will die.

These are examples of what we have referred to as "lawful randomness." In the nuclear case, the half-life of an unstable nucleus can be calculated from the principles of quantum mechanics and nuclear physics, along with the general laws of nature such as the conservation laws for energy, momentum, and charge. The half-life does not give a deterministic measure of when any single nucleus will decay, but for a large enough sample, the halflife gives an accurate measure of how many of the nuclei in the sample will survive over a given time interval. This is lawful randomness and is an inherent physical property of our universe.

Another example of randomness in nature is in the occurrence of skin cancer. It is well known that skin cancer can be induced by ultraviolet radiation from the sun. Ultraviolet radiation consists of high energy photons, photons that are energetic enough to alter the molecules that comprise human skin. A very small percentage of the photons incident on the skin will induce a cancerous mutation. Just as

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with radioactive decay, our best scientific understanding of how often photons will induce cancer in skin molecules is in terms of calculated probabilities. We cannot be certain of the exact effects of a single photon on a single human skin cell, but we can accurately calculate the probability of skin cancer occurring when a sufficiently large number of photons (from sunlight) and skin cells (in people) are involved. Here we have another example of a random process that operates under well-understood physical laws. And, of course, we are fortunate that not every high energy photon with the potential of inducing skin cancer will actually do so.

Other examples of the importance of randomness in the life sciences abound. In an earlier article in *PSCF*, Craig M. Story pointed out the example of antibody gene rearrangement as an example of a biological process that relies on randomness to achieve important positive ends.¹⁷

Returning to physics, there is a simple classroom experiment that can deliver surprising and random results that we can see with our naked eyes. Figure 1a is a typical experimental set-up for observing interference fringes using a light source, a card with two narrow, closely spaced openings (slits), and a screen. Figure 1b is a photograph of the areas of light and dark observed on the screen. The interference pattern in Figure 1b is well understood in terms of classical wave optics, and arises from the constructive and destructive interference of wavelets of light as they emerge from the slits. The same basic experiment can be performed with electrons by replacing the light source with an electron emitter and the photo-sensitive detector with an electron detector. The same type of interference pattern results with electrons as was observed for light-a series of parallel regions of electron registration and regions of no electron arrival.



Figure 1. Double slit interference experiment schematic set-up (fig. 1a) and resulting interference pattern (fig. 1b).

Nature has a surprise for us. In the light-based experiment, let us reduce the intensity of the light beam until individual photons are travelling, one by one, from the light source, through the slits, and onto the screen. At this point, it is convenient to think (like Einstein and others) of the light beam as a beam of individual particles of light (photons) rather than as a wave phenomenon, the usual conception of light. We can even take measures to verify that only single photons are being produced, and, instead of a screen, we can use a light detector capable of registering the arrival and position of individual photons. We can also make similar adjustments to the electron experiment, using a single-electron emitter and a detector sensitive enough to record the arrival and position of single electrons.



Figure 2. Results for a single-electron interference experiment. Photos of the registration patterns on the electron detector after (a) 11 electrons were recorded, (b) 200 electrons, (c) 6,000 electrons, (d) 40,000 electrons, and (e) 140,000 electrons.

The two experiments give similar results. Figure 2 is a photograph of the registrations on the electron detector.¹⁸ Each dot in the photo represents the arrival of a single electron. In (a), 11 electrons have been recorded; in (b), 200 electrons; in (c), 6,000; in (d), 40,000; and in (e), 140,000. The pattern seen in the light experiment is quite similar. Figure 3 is a series of time lapse photographs of the arrival of photons at the light detector.¹⁹ These figures show that when a sufficiently large number of particles have been emitted, the average behavior is the interference pattern expected by classical wave optics. However, notice that the behavior of individual particles is somewhat random, as seen in the photographs for small numbers of photon or electron arrivals. For example, across the entire area of the electron detector, we observe that electrons are less likely to be detected in the "dark" regions, and that electrons are more likely to be detected in the "lit"



Figure 3. Results for the single photon experiment. Photos of the registration patterns on the photon detector over increasing time intervals from a. through f., respectively. From http://www.tnw.tudelft .nl/en/about-faculty/departments/imaging-science-and-technology/ research/researchgroups/optics-research-group/education/experi mental-projects/photons-in-an-optical-interference-experiment/.

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regions, but we can predict nothing about the position of a given particle's arrival. The same can be observed for the individual photon experiment. These are also examples of lawful randomness, or randomness that is fenced in by physical principles.

Indeed, randomness seems to be woven into the very fabric of the universe. The 2012 Nobel Prize in physics was awarded to two physicists who, working independently, successfully observed individual particles exhibiting some bizarre quantum properties-properties of the superposition of quantum states. In one study, a single atom was found to be in two places simultaneously. In another experiment, an ion was put into a superposition state, which is the simultaneous existence of two distinctly different states. In both cases, the experiments confirmed that the most information we can have about a quantum superposition is the probability of getting outcome A versus outcome B. This is analogous to the Cs-137 nucleus decay, in which we can only know the probability that a given nucleus will decay in a given time interval. Quantum uncertainty produces random results, and this weird behavior appears to be a fundamental aspect of nature.

Nature may have more sources of lawful randomness than just quantum mechanics. The mechanisms of the development of life on our earth have been the topic of intense study over the past two centuries. Nearly all scientists now agree that the contemporary understanding of evolutionary processes is essentially correct, yet scientific work in this area of study continues. A number of evolutionary biologists (including Stephen Jay Gould) understand evolution to be a blind, random process. Simon Conway Morris moderates this position by suggesting that the "emphasis on randomness be replaced with an emphasis on deterministic outcomes that result largely from the role of ecological processes in speciation and extinction."20 Conway Morris suggests a number of systems connected with the development of life as being convergent; for example, protein structures, skeletal structures, eyes, sensory nervous structure, intelligence, and social behavior, to name a few. The bottom line is that the evolutionary mechanism of adaptation and natural selection is a powerful method for searching among the myriad of random possibilities, and even though there is a random aspect here, evolution is progressive.

Conway Morris maintains that we cannot predict the evolutionary future, but we can be confident that we are on a path to the future.²¹ Once life began on earth, sentient life was inevitable, according to Conway Morris. Once again, we have encountered a situation of lawful randomness – randomness that is fenced here by higher principles that apply to the biological world.

The Voice did not discuss nuclear physics with Job, but the Voice did spend some time discussing weather, including the distribution of water over the surface of the earth. Today we understand that the earth's water cycle employs processes of evaporation, condensation, and precipitation to distribute water (in its various forms) over the earth. This distribution is partially lawful, depending on a number of well-understood factors such as surface temperature, prevailing wind directions, and ocean currents. In fact, weather patterns can be described very well by deterministic equations.

The reason we cannot predict the weather with great accuracy is because these deterministic equations require precise knowledge of the entire Earth's weather system at a given point in time (this is often referred to as knowledge of "initial conditions"). Unfortunately, it is not possible to collect the perfectly accurate information needed as input to the equations. Even if we could obtain the detailed information needed, all the classical computers in the world are not capable of processing the amount of information involved. We may receive some small consolation from the fact that our calculations would not give accurate predictions anyway, due to the many nonmeteorological events affecting the weather all the time (volcanic eruptions, butterflies in the Amazon, etc.). Epistemologically, we are prohibited from accurate weather predictions by chaos theory, another twentieth-century development. General patterns of weather can be predicted using the deterministic laws of meteorology, but precise predictions are impossible because of the chaotic nature of weather systems resulting from their exquisite sensitivity to initial conditions.

These examples are but a small sample of physical and biological processes that exhibit randomness constrained by physical law. Nature's operation includes a component of "lawful randomness." Modern science takes chance seriously, for randomness occurs at all levels in nature. At the microscopic level, there is randomness in terms of nuclear processes, individual photon and electron phenomena, and the initiation of cancer. At the macroscopic level, we find randomness in patterns of disease, weather, and the outcomes of evolutionary processes. Many of these lawfully random phenomena have been observed throughout history, and some (such as the weather) would even have been within Job's experience.

Randomness and God's Nature

Is the idea of the existence of randomness in nature consistent with God's attributes? The concept of randomness does not usually jump into one's mind when thinking about God's attributes. We do not think of God intentionally creating the universe with the characteristic of ontological randomness – physical processes having a true, inherent random character.

Recall the very first thing God tells Job in chapter 38: Job does not know enough. What does Job not know? The two speeches of chapters 38-41 (which contain the greatest number of words by God in a speech in the entire Bible) make it starkly clear that Job does not know enough about God's strategy in creation or about how it operates.²² In particular, Job does not know enough about those aspects of God's character as revealed in the created order. The Voice points to creation as being well planned and well constructed, and progressing in complete accordance with God's plans. This judgment echoes a short but elegant evaluation of creation by God in Genesis 1:31a: "God looked over all he had made, and he saw that it was very good!"

As Walton points out, "very good" here implies that creation is well planned, organized, and functions properly, according to God's pleasure. "Good" does not imply a standard of moral perfection here. Instead, God creates and governs by wisdom, and even though justice is one of his attributes, the cosmos (including our world) does not reflect that particular attribute.²³ The randomness that exists in nature implies that all of creation is subject to the effects of random events, and that the individual random events can be both beneficial and harmful to parts of creation, including humans. We can all contract cancer, and we can be a victim of a tornado or an earthquake. As Jesus said, referring to his Father in Matthew 5:45b,

For he gives his sunlight to both the evil and the good, and he sends rain on the just and the unjust alike.

So, we should carefully consider the limits of our knowledge and understanding before making the claim that the randomness seen throughout nature is evidence that God is unjust in some ways. The question is, where does randomness fit into the good plan and wise management that the scriptures claim for God?

The Goodness of Creation (yes) and Natural Evil (really?)

The overwhelming majority of passages throughout the Bible declare creation to be good — and sometimes it is called very good or exceedingly good.

- Creation is associated with good planning and the ability to carry out creation (Isaiah 40).
- Creation is associated with wisdom (Proverbs 3 and 8).
- Creation is emphatically praised (Psalms 8, 19, 33, 74, 104, 145, 148).
- Creation is called "very good" (Genesis 1).
- Creation is the result of a wise and careful plan and skillful construction (Job 38).
- Creation is the work of God and the Second Person of the Trinity, the Word; the Word is revealed to be the one through whom God created and is the one who faithfully upholds creation (John 1, Colossians 1, and Hebrews 1).

Creation is never criticized in the Bible. There is nothing in the Bible that indicates that there is anything wrong with creation itself. However, creation groans and longs for the eschaton (Rom. 8). In the story of the Fall (Gen. 2 and 3), the human formed early on the day of creation is given responsibility to develop, preserve, and carefully watch over and protect creation (Gen. 2:15), this after the human was formed from the dust of the ground (Gen. 2:7). The disobedience of humanity results in an antagonistic relation between humanity and the ground, as human labor and toil is now required to work the ground, overcoming weeds and thorns to gain a harvest.

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Yes, creation awaits the eschaton, we must work the land, and natural evil exists. But the overwhelming evaluation of creation by the Bible is that it is outstanding (nothing is wrong with it), and creation itself has not fallen (creation does not sin). In particular, the fact of natural evil is well displayed throughout the Bible without being criticized.

A relevant example is the pericope in John 9:1–3, where Jesus and his disciples come upon a man who had been blind from birth. The disciples ask Jesus, "Why was this man born blind? Was it because of his own sins or his parents' sins?" (John 9:2b). Jesus answers, "It was not because of his sins or his parents' sins" (John 9:3a). Here is an example of natural evil (a birth defect), and Jesus declares it is not the result of sin.

In summary, creation (nature) as presented in the Bible gets very good marks. And this evaluation, by implication, also falls on natural evil, and we would propose that this also applies to the natural evil that is associated with random natural events. Nowhere in the Voice's speeches from the storm do we find any criticism of creation. So we then need to ask, what possible good can come from natural evil and random natural events, and what should be our appropriate response, as followers of Jesus, to natural evil and to those who suffer the consequences of natural evil? In other words, why is natural evil, including random natural events, a part of a wisely planned and carried-out creation?

Nature's Freedom, Randomness, and Fine Tuning

Before further addressing natural evil, we need to recognize the crucial nature of (1) fine tuning and (2) the freedom of the natural world to explore new pathways. Both are at least partially related because of the random nature of certain natural events.

As a first example, consider the genome. The genome does not copy with 100% accuracy, and these copying mistakes (variations) can either be beneficial or harmful – many times the harmful ones die out because of differential reproductive competition or the early death of the creature because of the mistake. But the occasional beneficial variations allow the organism to gain reproductive advantages

and to adapt to changing environments, resulting in a competitive edge, and hence an advantage for the continued existence and thriving of the organism. Randomness plays a crucial positive role here.²⁴

Fine tuning has played a crucial role in the development of our cosmos and carbon-based life here on Earth. The discovery of the fine-tuning nature of physical constants and physical laws, plus the fortuitous characteristics of our solar system (including the relation of our earth to the sun), have played an important role in the development of life on our earth. In the latter part of the twentieth century, physicists discovered that there are roughly thirty characteristics of the universe that had to be just what they are, sometimes within unimaginably tight limits, or carbon-based life would not have developed on our earth, and humans would not exist.²⁵ These characteristics include the strengths of the fundamental forces; the mass and charge of the electron, proton, and other subatomic particles; the gravitational constant and other physical constants; the physical relationships between bodies in our solar system; and many others. The workings of our cosmos are reflected in the physical laws that make up the finely tuned array of required conditions for life to exist on Earth, and, as discussed earlier, randomness is a fundamental aspect of these laws. Randomness is required for humans and the rest of creation as we know it to exist. Randomness is the cost for the existence of carbon-based life here in the cosmos some 13.8 billion years after the Big Bang.

The physical characteristics of our universe/earth system—lawful randomness (the mix of chance and necessity) coupled with fine-tuning—continue to be crucial to the well-being of our planet and its living creatures. Hence, the existence of natural evil, including its random aspect, is crucial to the wellbeing of our entire earth's ecosystem. We need natural evil. I am not sure that I will praise God for the tornado that destroys my house or kills my family, but, in the overall scheme of things, that tornado is necessary.

God knows when the sparrow falls. God cares. But in spite of God's concern for the sparrow, nonetheless the sparrow indeed falls—God does not prevent the sparrow's demise (Matt. 10:29). If the sparrow did not fall—if there were no creaturely death in the world, we would be buried in sparrows and every previously living thing, and most likely the earth's life would be radically different, perhaps with no humanity.

So, creation is good and well planned; it came out as God planned (Job 38), no surprises. Like Job, we really do not know enough about creation. In particular, we need to understand natural evil. Our guess is that many Christians do not understand natural evil, its relationship with randomness, and how to react to it. In order to understand natural evil, we need to understand and appreciate randomness.

Theological Implications

Certain theological conclusions follow in a natural way. God's gift of freedom to nature implies that a fundamental characteristic of nature is its inherent randomness, and, hence, God withholds a portion of his omnipotence in normally choosing not to intervene in the day-to-day operation of the universe, including the earth. However, we do not want to say that, if the occasion calls for it, he will never intervene. Miracles have and will continue to occur, the principal miracles of the past being the incarnation and resurrection of Jesus. Miracles are truly unexpected providences associated with unprecedented situations that carry extraordinary religious significance. God will intervene, not so much by suspending the laws of nature in a given instance, but by bringing into play new aspects of nature that address a situation in an unprecedented way.²⁶ The result is that, in the normal course of weather events, tornados will develop and sometimes destroy cities and kill people. Could God have diverted the storm to an unpopulated area? Yes, he could, if he so chose.

But it seems that God will not stop a rattlesnake from doing what is natural to rattlesnakes—striking a nearby warm-blooded object such as a mouse or a person's leg. An eagle will feed her brood with a fish or a pet dog. A tick, carrying Lyme disease, will latch on to any nearby blood-carrying creature—dog, deer, or human, for example. Each can become ill, and even die, as a result of the tick's bite. An earthquake once destroyed a church filled with worshippers, killing hundreds. In many cases, people suffer. Is this suffering from natural evil the result of sin? We repeat Jesus's judgment in John 9

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and God's judgment in Job 42 in declaring that the answer is a resounding NO!!! It is rather nature doing what nature was designed and given freedom to do in most cases—and *must* do for the ongoing health and existence of the cosmos and the world.

Natural evil has two diametrically opposed characteristics. Natural evil is associated with natural events that are (1) consistent with and necessary for the outworking of fine-tuning for the continuance of the development of the cosmos, the earth, and life on the earth and (2) random in nature but can be harmful to those who are victims of their outworking. Thus, they are ecologically beneficial, but, for an individual, they can be quite harmful. And these events fall on the just and the unjust—all people suffer.

Is natural evil a good descriptive name for such a phenomenon? We think not. But what should it be called? We invite the reader to consider and suggest alternatives.

As a result, we certainly will never say that a tornado that levels a city such as Joplin, Missouri, or Moore, Oklahoma, is evidence of God punishing these cities for sin. No. We say that those who suffer from tornados are making a sacrifice for the wellbeing of the world and the cosmos, and that their suffering, when it occurs, should be seen by Christians as sacrificial and an opportunity for compassion-recall Jesus's response to the natural evil suffered by the man born blind (John 9). As members of the human family, our response should always be to offer relief and help for those who suffer the consequences of natural evil. God is not punishing; God is not even directing the tornado at these cities. But God is allowing the natural world, the world that the Son sustains by the power of his command (Heb. 1:3), and the creation that he holds together (Col. 1:17), to carry out the processes that reflect how the universe was created and continues to be created.

No part of creation, including humans, is immune to suffering. Do we learn anything in Job about helpful responses to suffering? Longman suggests that Job's speeches prior to the Voice's speeches are not examples of a proper attitude toward God in the midst of suffering. Yet, later, Job becomes silent (40:4–5). This attitude toward suffering is also found in Lamentations.²⁷ In the end, Job's anger subsides,

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and he demonstrates that he will worship God even in the midst of suffering. $^{\ensuremath{^{28}}}$

In summary, we suggest that the message that God is sending in cases such as Job's, is that suffering from natural evil may be a cost of being part of a good creation. Creation continues, God reigns and upholds it faithfully, and the groaning of creation will end with the advent of the New Jerusalem. And for those who suffer, words from Exodus 33:14 (NIV) are relevant:

The LORD replied, "My Presence will go with you, and I will give you rest."

Notes

¹Job 1:1b, *Holy Bible – New Living Translation* (Carol Stream, IL: Tyndale House, 2007). All subsequent scripture quotations are also from the same version of the Bible.

- ²For a discussion of the use of "the challenger" rather than "Satan" here, see John H. Walton, *Job: The NIV Application Commentary* (Grand Rapids, MI: Zondervan, 2012), 64–7.
- ³Marvin H. Pope, *The* Anchor *Bible Job* (Garden City, NY: Doubleday, 1965), xvii–xxii.

⁴Walton, *Job: The NIV Application Commentary*, 39–48. ⁵Ibid., 399.

- ⁶David J. A. Clines, *Word Biblical Commentary Job*, vol. 18B (Nashville, TN: Thomas Nelson, 2011), 1088–9.
- ⁷Walton, Job: The NIV Application Commentary, 398.
- ⁸Clines, Word Biblical Commentary Job, 1089.

9Ibid.

¹⁰Pope, *The* Anchor *Bible – Job*, xxii.

¹¹Walton, *Job: The NIV Application Commentary*, 399; and Tremper Longman III, *Job*, Baker Commentary on the Old Testament: Wisdom and Psalms (Grand Rapids, MI: Baker Academic, 2012), 451.

¹²Walton, *Job: The NIV Application Commentary*, 400. ¹³Ibid., 401.

¹⁴Clines, *Word Biblical Commentary – Job*, 1089. ¹⁵Ibid., 1090.

¹⁶We want to point out that James Bradley, in a recent issue of this journal, did indeed consider some of the theological implications of randomness in his article, "Randomness and God's Nature," *Perspectives on Science and Christian Faith* 64, no. 2 (2012): 75–89.

¹⁷Craig M. Story, "The God of Christianity and the G.O.D. of Immunology: Chance, Complexity, and God's Action in Nature," *Perspectives on Science and Christian Faith* 61, no. 4 (2009): 221–32.

¹⁸A. Tonomura, J. Endo, T. Matsuda, T. Kawasaki, and H. Exawa, "Demonstration of Single-Electron Buildup of an Interference Pattern," *American Journal of Physics* 57 (1989): 117–20. The YouTube video, "Tonomura's electron double slit experiment without narration," shows the development of the two-slit interference pattern with electrons, http://www.youtube.com/watch?v=_oWRI-LwyC4.

¹⁹"Making Discrete Photon Effects Visible in an Optical Interference Experiment," accessed Dec. 23, 2013, at http:// www.tnw.tudelft.nl/en/about-faculty/departments/imaging -science-and-technology/research/researchgroups/optics -research-group/education/experimental-projects/photons -in-an-optical-interference-experiment/.

- ²⁰Simon Conway Morris, *Life's Solution: Inevitable Humans in a Lonely Universe* (Cambridge: Cambridge University Press, 2004), 236.
- ²¹Ibid., 307.

²²Walton, Job: The NIV Application Commentary, 411.

²³Ibid.

- ²⁴Francis Collins, *The Language of God* (New York: Free Press, 2006), 189–90.
- ²⁵John Polkinghorne, *Science and Creation* (Boston, MA: New Science Library, 1988), 22.
- ²⁶John Polkinghorne, *Quarks, Chaos and Christianity* (London: Triangle, 1994), 79–89.

²⁷Longman, Job, 453–4.

²⁸Ibid., 456.

ASA Members: Submit comments and questions on this communication at www.asa3.org \rightarrow FORUMS \rightarrow PSCF DISCUSSION.

An Environmental Science Challenge

Science is constantly moving. **Dorothy Boorse**, professor and chair of biology at Gordon College and co-author of the textbook *Environmental Science* now in its twelfth edition, has written an intriguing description of the latest developments in environmental science along with insights and challenges it raises for Christian faith. The essay is provided at http://www .csca.ca/wp-content/uploads/2013/12/Environmental Science2013.pdf.

This article is intended as an invitation. Readers are encouraged to take up one of the insights or challenges, or maybe a related one that was not mentioned, and draft an article (typically about 5,000– 8,000 words) that contributes to the conversation. These can be sent to Boorse at Dorothy.Boorse @gordon.edu. She will send out the best essays to peer review, and then we will select from those for publication in an environmental science theme issue of *Perspectives on Science and Christian Faith*.

The lead editorial in the December 2013 issue of *PSCF* outlines what the journal looks for in article contributions. For full consideration for inclusion in the theme issue, manuscripts should be received electronically before March 30, 2014.

For those readers who prefer to take a literary approach in sharing their ideas, please submit essays (up to 3,000 words), poetry, fiction, or humor inspired by Boorse's invitational essay to emily@asa3.org for possible publication in *God and Nature* magazine.

Looking forward to hearing your perspectives,

James C. Peterson Editor, Perspectives on Science and Christian Faith