GOD, NATURE, AND SCIENCE: AN ADVENTIST VIEW

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Introduction

Different world views offer different proposals for the relationship of God and nature, each carrying its own set of implications for studying questions of origins. Three categories of world views are common today. In the atheistic world view, there is no God, so nature must be viewed as autonomous, and the idea of god is irrelevant. Chance and natural causes are the only processes available to explain origins, so the crucial question is whether they have the power needed to produce the cosmos we observe.

Pantheism holds that nature and God are identical. In this world view, nature is viewed as autonomous, and even having its own "mind" so that the idea of a separate deity is meaningless. In pantheism, nature is believed to possess divine power so there is an inherent tendency toward self-organization leading to the emergence of life and complexity. Several Eastern mystical religions are forms of pantheism. The crucial question here is basically the same as for the atheistic world view – whether nature appears to have the necessary properties to explain such phenomena as the origin of life and the origin of humans.

A third position is theism – that God and nature are separate but nature is not independent of God; God acts continuously to maintain nature, and occasionally acts in special ways to accomplish His will in specific instances. Nature is totally dependent on God, for both its origin and its continuing existence. This is the view of Christianity, Judaism and Islam. The crucial question here is not about the properties of nature, but about the plausibility of the existence of a God with sufficient power to create nature.

Some world views do not fall neatly into one of the three categories described above. An example is deism, the view that God started the universe but then left it to develop without further guidance. Deism is the notion that God started the universe but it continues without further interaction with God. It shares with mainstream theism the recognition of a Creator in the beginning, but from that point on, it is similar to both atheism and pantheism in that it requires that nature itself possess all the properties needed for further development. I do not address deism separately, but the problems of atheism in explaining any phenomenon after the origin of the universe also apply to deism.

In this paper I will explore briefly the question of whether nature appears to have the necessary powers to explain origins. I will conclude it does not, and that theism provides the basis for the most plausible story of origins.

Using Observations to Understand the Relationship of God and Nature

The probability of theism versus atheism or pantheism can be investigated by answering the question of whether nature possesses the properties needed to generate life and complex organisms. If it does, all three world views are open for consideration; if it does not, atheism and pantheism are falsified, and theism remains as the worldview most likely to be true.

I will focus on two questions. In the first, I will consider whether chance appears to be a sufficient causal explanation for the origin of the universe and of life. The alternatives are that the causative explanation must be either natural law or intelligent design. I will conclude that chance is not a sufficient explanation. Next I will consider whether natural law seems a sufficient causal explanation. I will conclude it does not. Finally I will consider whether intelligent design appears a probable and sufficient cause. In this case, the answer is affirmative.

Question 1: Is chance a sufficient causal explanation for life and the universe?

Two lines of evidence strongly point to the insufficiency of chance in causing the origin of nature. First, the universe has a specific set of properties without which life would be impossible.[1] The relative strengths of the fundamental forces, such as gravity and the forces within the atomic nucleus, along with the values of the physical constants, such as the speed of light, are finely tuned in a way that makes life possible. Slight changes in these factors could make it impossible for atoms and molecules to exist. Other slight changes could make it impossible for hydrogen or water to exist. The probability is vanishingly small that all these factors would be so finely tuned by chance. The highly specific features of the universe rule out chance as a sufficient causal explanation for its origin.

Second, living organisms are made of cells that are composed of highly specific biomolecules, including proteins made of amino acids, and nucleic acids made of nucleotides. The potential number of different ways in which amino acids can be combined into a moderately sized protein, and nucleotides into a small gene, is far greater than the number of electrons in the known universe. Only a relatively small proportion of proteins and nucleic acids are suitable for sustaining life. Proteins and nucleic acids interact in a number of different ways and slight changes in the sequences of even a single protein or nucleic acid can sometimes cause death. The probability that amino acids would arrange themselves by chance into sequences appropriate for life is so remote as to be unthinkable.[2]

Question 2. Is natural law a sufficient causal explanation for origins?

Natural laws as currently understood are not adequate to explain the origin of the universe. There is no natural law that specifies that the properties of our universe should be suitable for life. As far as is known, the universe could just as well have had other properties that would have made life impossible. Neither chance nor natural law, nor any conceivable combination of the two, is a sufficient causal explanation for the origin of the universe.

The origin of life is not explained by natural law. Life depends on a number of components, including proteins with specific shapes which are the result of specific amino acid sequences. In the origin of life, the first proteins and nucleic acids would have to be produced abiotically, through natural law. No abiotic process is known for making proteins or nucleic acids. Natural law is sufficient to drive the disintegration of proteins and nucleic acids, but is, as far as we can tell, not sufficient to cause their production under abiotic conditions. Our present knowledge may be incomplete, but there is no reason to suspect that there is some undiscovered "law of abiotic protein construction." The abiotic origin of nucleic acids faces the same problems, natural law is sufficient to destroy them, but not to produce them abiotically. More generally, natural processes are commonly observed to cause death of living organisms, but have never been observed to cause life to arise abiotically. These facts rule out natural law as a sufficient causal explanation for the origin of life.

Question 3. Is design a sufficient causal explanation for origins?

Design implies purpose, which implies an intelligent mind. To claim that the universe and life are designed is to claim that they are the result of a decision made by an intelligent mind for a purpose. The design explanation is favored by most Christians, including many scientists and philosophers.

A case for origin by design can be made in two ways. First, the only kinds of causal explanations known are chance, natural law, and design.[3] Since both chance and natural law have been shown to be inadequate as explanations for the origin of the universe and of life, design is the only viable causal explanation available. This conclusion is corroborated by the positive evidence for design discussed below.

Some critics have claimed that design is an unreliable inference because there are no objective criteria for identifying design. But this criticism is not valid. A number of criteria are commonly used to identify design.[4]

For example, consider how an archaeologist might identify a stone ax as designed. First, a stone ax has an unusual shape not normally found among stones in natural settings. Second, the ax has fracture marks on it suggesting its shape has been modified by non-random processes such as being struck against another rock. Third, this unusual shape fits the object for a recognizable function associated with human activity. Fourth, the ax shows evidence of having been used in a manner associated with human activity. Thus it appears that the stone ax was intentionally altered for a purpose. In short, it was designed.

More recently, two more sophisticated identifying marks of design have been proposed -- irreducible complexity, and specified complexity. These features are thought to be reliable indicators of design, although they are not necessarily present in every object that has been designed.[5]

Irreducible complexity[6] refers to a system composed of a number of parts in which removal of certain parts leaves the system without any function. Such a system cannot be assembled by natural selection one part at a time because one or more steps in the process have no selectable function. The system is said to be "irreducible" in terms of its functionality. It is complex because there are several interacting parts. The ordinary mousetrap is the classical example of irreducible complexity.

Specified complexity[7] refers to a phenomenon with multiple interacting parts that form or produce a recognizable pattern. In this case, the term "specified" means that the pattern in question carries some information or meaning to the observer. For example, a pattern of marks on a beach would be "specified" if it was in the form of a written message, but not if it were merely a series of ripples produced by wave action. Implicit in this idea is the notion that information is both created and recognized by intelligent minds, not by mindless physical processes.

When we examine living organisms, do we see "marks" we might reasonably interpret as the result of design? Yes, we do. Many examples have been proposed, although not all are equally persuasive. Some examples that seem persuasive are the information content of the DNA, the molecular machinery the living cell, e.g.: the cilium; blood clotting; protein synthesis; sexual reproduction; and others.

In conclusion, design seems a compelling explanation for the origins of the universe and life. This conclusion is strengthened by the fact that chance and natural law seem insufficient causes. The evidence for design implies that God acted with purpose to create both the universe and life.

God's Actions in Nature and a Proposed Classification

God may act directly in nature, through primary causation, or indirectly through secondary causation. In primary causation, God acts directly on matter and energy to cause a desired effect. In secondary causation, God causes an event indirectly, such as by allowing natural processes to proceed toward some predetermined end. The distinction between primary and secondary causes was noted by Thomas Aquinas,[8] although the application here is my own.

The distinction can be illustrated by comparing the causes resulting in a painting with those resulting in a photograph taken by remote sensing. The picture is accomplished through direct agency in the case of a painter who directly applies the paint to the canvas. In the case of the photograph, the picture is produced through secondary processes in which the photographer uses a remote sensing device to trigger the camera. The photograph was produced through the intentions of the photographer so it was not the result of chance (although certain details might be due to chance, such as which direction an animal was looking when it triggered the camera), but the image was produced indirectly rather than being directly applied by the person.

God might also act in nature continuously or intermittently. For example, God acts continuously to sustain the existence of the universe. At certain times, God acts in special ways as a voluntary agent, much as a human being may act as a voluntary agent. Thus God acts both continuously and intermittently.

Questions of whether God's actions are continuous or intermittent, and whether they are the result of primary or secondary causation may be used to classify God's activity in nature into four categories. These categories are illustrated in Table 1 (see page 6). Examples of each type of action are described below. These points are not intended to be taken as new, but are part of the traditional Christian view of God and nature.

Continuous, direct activity

In the ordinary operations of nature, God is continuously acting, "upholding the universe by His word of power."[9] God's actions are so consistent and reliable that we recognize the patterns as "laws of nature." We often are able to use these "natural laws" to predict what will happen in a given set of circumstances. If God were to stop acting in this way, the universe would cease to exist.

God's continuous, consistent, direct action is the cause of the general "laws of nature."[10] These general laws maintain the existence of the universe.[11] By "general laws" I mean observed regularities that seem to be in effect throughout the observable universe. The general laws of nature include the fundamental forces (gravity, strong and weak nuclear forces, and the electromagnetic force), and the values of the physical constants (e.g., the masses of the elementary particles, the speed of light, Planck's constant, etc). The number of known general laws of nature may be surprisingly small.

The practice of science is based on the consistency of God's continuous direct action. One of the aims of science is to identify these consistencies.

Intermittent, direct activity

God also acts intermittently. God's intermittent direct action may be the cause of events that are perceived as supernatural events or miracles.[12] By supernatural event I mean an event that could not have been predicted from the preceding state of matter, and which would not have occurred except for the action of an intelligent agent. Supernatural events would include "miracles," and perhaps many activities of human beings. Supernatural events normally are consistent with the general laws of nature, although in theory exceptions could occur. For example, if God created through a process like the Big Bang, we do not know of any laws that would apply to the process. On the other hand, there is no reason to suppose that God had to break the laws of the fundamental forces or change the physical constants in order to create wine from water, or to raise the dead to life, or to calm the stormy sea. These were miracles indeed, but there was no need to break the general laws of nature. Anyone could probably do the same thing, without

Table 1. Four categories of divine activity, and their proposed relationship to science and Scripture

God's actions:	Direct/Primary Action	Indirect/Secondary Action
Continuous Action	Sustaining the existence of the universe General "laws of nature" Examples: gravity, electromagnetic force, physical constants Science seeks to identify the regularities Primarily theoretical physics Scripture identifies origin The fundamental forces are probably God's direct activity Only metaphysical conflict between science and Scripture	Sustaining physical processes/mechanisms that result from direct agency in the physical constants and fundamental forces "Local" events or processes Examples: weather, sunrise, metabolism; sometimes thought of as "laws of nature" but only localized effects of such laws The main activity of experimental science Science seeks to explain in terms of general laws Scripture identifies God as primary cause, but does not explain mechanism Little or no conflict between science and scripture
Intermittent Action	Miracles (some) Direct, supernatural, singular acts on matter and energy Examples: creation, initiating secondary processes at special times Science defers to religion or denies supernatural Scripture identifies unseen cause Conflict if science fails to accept supernatural cause	Miracles (some) Providential events resulting through secondary mechanisms Example: providence, events timed for a purpose; Flood, Jordan crossing, quails Science struggles to explain, or fails to see significance Scripture identifies supernatural cause Conflict if science fails to accept supernatural cause

breaking general natural law, if he or she were omnipotent, omniscient, and able to manipulate matter and energy by fiat.

Science may have a very difficult time analyzing supernatural events, since one cannot observe what God is doing. This does not necessarily mean that a scientist should not attempt to study supernatural events, but it does mean that the scientist cannot rely on explanations with which he is already familiar. In such cases, the probability of successful analysis is likely to be rather low.

Continuous secondary activity

God is also continuously active through secondary mechanisms. For example, the weather system is continuously maintained through the general laws of nature. God "causes the sun to shine on both the just and the unjust."[13] However, the specific state of weather itself is probably not directly manipulated by God, except for special ("supernatural") events. He ordinarily "causes" the weather through secondary (indirect), rather than primary (direct) means. The weather system can be compared to a machine that operates on consistent principles without continuous external guidance. The consistency of weather processes may lead us to consider weather patterns to be laws of nature, but they really are only localized effects of general laws.

Human development is another example of continuous activity through secondary processes. Each of us developed from a single living cell into a multicellular individual through what appear to be purely physical processes, yet we speak of ourselves as having been created. In doing so, we acknowledge that God may "create" through secondary processes, such as in the continuity of human life.

Science is especially well suited to studying events that result from God's continuous activity, whether direct or indirect. Events caused through secondary mechanisms are a major subject matter of science, in which explanations are sought, ultimately, in terms of general laws.

Intermittent secondary activity

God may also act intermittently through secondary causation.[14] Answers to prayer are often brought about through special actions of God using secondary causes. For example, the needy family who prays for help may find a package on their doorstep. The package may have been put there by an individual who was impressed to do so. In this case, God may have acted directly on one person, using that person as a secondary cause in answering another person's prayer. Certain Biblical miracles seem to have involved God's action through secondary mechanisms. Examples include the use of wind to bring "quails" to the Hebrews in the wilderness, the use of hornets to drive away Israel's enemies, the payment of the tax for Peter and Jesus by the coin in the fish. However, in each case, the secondary process was probably initiated by direct divine activity. Hence, a miracle may involve both secondary activity and primary (direct) activity.

Science may have some success in analyzing events involving intermittent secondary causation, but failure to recognize divine activity is likely to cause difficulties in reaching conclusions in harmony with Scripture.

Distinguishing Origins and Operations

In studying God's activities in nature, we should distinguish between questions of origins and questions of operation. Origins are singularities while operations occur continuously. Having a good understanding of operations does not necessarily imply a good understanding of origins.

For example, consider the operations of an automobile. Fuel is burned in an internal combustion engine, releasing energy which drives the pistons. This movement is transferred to the wheels through a series of mechanical linkages, with the result that the wheels are turned, propelling the car forward. Several control mechanisms guide the direction of the car's movement, and cause it to move or stop at the will of the operator.

A good mechanic understands the "automobile laws" that govern the operations of the automobile, and is able to take appropriate action to maintain the machinery in good order or to make repairs when needed. It might seem that the mechanic knows everything there is to know about an automobile.

Does a mechanic's thorough understanding of the operations of an automobile also give him the ability to explain how automobiles are made? Of course not. It is likely that the mechanic has never visited a manufacturing plant to see how an automobile is made. We would be skeptical of any mechanic who claims that the manufacturing of an automobile does not require any processes he has not observed, nor use any principles that are unknown to him.

As scholars, we are a little bit like the mechanic. We are able to observe many physical processes operating in the universe, but we have never seen the origin of a universe. Likewise, we understand a great deal about physico-chemical processes in living cells, but we have never seen life originate abiotically. The origins of life and the universe involve processes that are not involved in their day-to-day operations. Thus it is useful to consider questions about origins as a separate category from questions about operations in nature.

Miracles and natural law

I have stressed that miracles do not necessarily require violations of "natural laws." I do this because many scholars seem to feel that miracles are, by definition, violations of natural laws, and thus a threat to the practice of science.[15] This is not necessarily the case. Science may not be able to explain miracles, but the cause of this failure often may be because we cannot see what God is doing rather than because we are incapable of understanding the physical mechanism. Thus, it is not fatal to the practice of science to admit that miracles may occur, unless one adopts

the philosophical position that all events must be explained by science, appealing only to natural processes.

What about the ability of scientists to study supernatural events? For example, is it justifiable for a scientist to study creation if it was a supernatural event? Does the Biblical story of origins render science irrelevant? The answer to this question must be a qualified "no."

Belief in the Biblical story of origins does not render science irrelevant. Believers in the Biblical account of creation will find many scientific questions to explore. From the beginnings of modern science, believing scientists have been active in studying the nature of the universe and our world. A creationist will approach the entire realm of experimental science in much the same way as anyone else. God's continuous activity in upholding the universe produces results that are accessible to all. Science is based on philosophical presuppositions derivable from Scripture, that Jesus Christ continuously upholds nature,[16] and that He is "the same yesterday and today and for ever."[17]

Belief in the miraculous origin of the universe and of life does not render science irrelevant, but may affect what questions a believer thinks are likely to be fruitful for study. Since miracles may or may not be accomplished through familiar processes, one cannot *a priori* rule out using scientific approaches to try to understand them. A major difference between believers and others on this question will be the explanatory options considered. A non-believer will be restricted to processes within the known laws of nature, while a believer will be open to the possibility that some events may be due to supernatural processes that are undiscoverable through science. Science could even be helpful in identifying such singularities. The lack of progress by scientists in explaining the "Big Bang" or the origin of life through natural processes are examples of the failure of science to explain phenomena identified in Scripture as caused supernaturally.

Conclusions

Origins may sometimes be a contentious issue in science and faith because of differing presuppositions about God's relationship to nature. An argument has been presented here that the evidence points to divine activity in nature, expressed in both primary (direct) and secondary (indirect) causation. God's actions in nature may be described in four categories: continuous and primary, continuous and secondary, intermittent and primary, and intermittent and secondary.

Science is well-equipped to study God's continuous activities, while Scripture emphasizes God's intermittent activities. Scientific methodology restricted to observable physical mechanisms is inadequate to discover and explain our origins. Certain aspects of reality seem to be best explained by design and direct divine causation. The Biblical description of God provides essential information in our quest to understand the relationship of God, nature, and humans.

End notes

[1] Fine-tuning of the universe is discussed in Barrow,J.D. and F.J. Tipler. 1986. The anthropic cosmological principle. Oxford: Oxford University Press; Ross, Hugh. 1995. The creator and the cosmos. Revised. Colorado Springs: NavPress.

[2] Problems in the origin of life are discussed in numerous publications, such as: Thaxton, C.B. et al. 1984. The mystery of life's origin: Reassessing current theories. New York: Philosophical Library; and Spetner, L.M 1996. Not by chance! Brooklyn: Judaica Press.

[3] Dembski, W.A. 1998. Redesigning science. Pp 93-112 in (W.A. Dembski, ed.) Mere Creation. Downers Grove, IL: InterVarsity Press.

[4] See W.A. Dembski. 1998. The Design Inference. Cambridge: Cambridge University Press.

[5] Intelligent design is sometimes used to camouflage the activities of the designer, for example a donor who wishes to remain unobserved, a criminal who wishes to hide evidence of his activities, or a person who wishes to send a signal only to a specific recipient.

[6] Behe, M.J. 1996. Darwin's Black Box. New York: Free Press.

[8] Demski, W.A. 1998. The Design Inference. Cambridge: Cambridge University Press.; Dembski, W.A. 1999. Intelligent Design. Downer's Grove, IL: InterVarsity Press.

[9] Thomas Aquinas. Summa Theologia Part 1, Articles 19, 22; http://newadvent.org/summa

[10] Hebrews 1:3, RSV.

[11] Jeeves, M.A. and R.J. Barry. 1998. Science, life, and Christian belief. Grand Rapids: Baker Books, p 40; Polkinghorne, John. 1998. Belief in God in an age of science. New Haven: Yale University Press, p 54; Poythress, V.S. 1999. Response to Robert C. Newman, pp 148-152 in JP Moreland and JM Reynolds, eds. Three views on creation and evolution. Grand Rapids: Zondervan, p 150-151; Pearcy and Thaxton p 80, 90; Kaiser, C.B. 1991. Creation and the history of science. Grand Rapids: William B. Eerdmans, p 30 describes the distinction between *potentia ordinata* and *potentia absoluta.*

[12] Hebrews 11:3

[13] E.g., see Moreland, J.P. 1997. "Science, miracles, agency theory and the god-of-the-gaps. p 132-148 in R.D. Geivett and G.R. Habermas, eds. In defense of miracles. Downers Grove; InterVarsity Press, p 142-143; Purtill, R.L. 1997. "Defining miracles." Pp 61-72 in R.D. Geivett and G.R. Habermas, eds. In defense of miracles. Downers Grove; InterVarsity Press, p 62-63, 68 ff.; Lewis, C.S. 1960. Miracles. New York: Collier Books, p 47, 59, 60.

[14] Matthew 5:45

[15] Jeeves, M.A. and R.J. Barry. 1998. Science, life, and Christian belief. Grand Rapids: Baker Books. p 42

[16] Hume, David. 1997. Of miracles. [taken from Hume's book, An enquiry concerning human understanding] Pp 29-44 in R.D. Geivett and G.R. Habermas, eds. In defense of miracles. Downers Grove; InterVarsity Press, p 33.

[16] Colossians 1:17; Hebrews 1:3

[17] Hebrews 13:8, RSV