Perspectives on Orthodoxy, Evolution, and Ecology

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Ecology in the Modern Context

The goal of this paper is to establish two claims: first, that ancient Christianity is not based on concepts that permit humans to "abuse" nature and the environment, and second, that ecology and evolution as scientific disciplines are tightly linked and that a failure to recognize one or the other as valid will have significant societal impact. These views are synergistic: a harmonious relationship between humanity and nature can be founded upon the ancient teachings of the Church as much as upon the views of contemporary science.

Today, the environmental crisis has come to play a critical role in public debate both in the political arena and in academic circles. One aspect of these discourses has been the blame that many non-Christians and even Christians have placed at the feet of Christianity for the existence of ecological problems. Many, including Sallie McFague and Elizabeth Johnson,[1] have expressed the view that the ecological crisis is the direct result of an anthropocentric worldview that has led to an exploitative attitude toward the world and environment. According to this perspective, human beings are the center of the world, and the entire world is at their disposal to use in any way necessary to make humans more comfortable. This kind of anthropocentrism is often attributed to the influence of Christianity.

The ecological problem has proved to be a means of polarizing society in the United States. On one side of the argument are those that support the use of nature solely for human gain, with no inclination toward conservation, protection, or even a slowing down of the pace of the exploitation of environ-

mental resources. On the other side of the spectrum are the broad scientific community and a large component of the ecological movement itself. In taking the opposite view, they have often blamed Christians for environmental exploitation. This has been based partially on the statements of certain Christian contemporaries and partially on their belief that Christianity propounds an anthropocentric view of the world that can be (mis)interpreted as prescribing the use of all creation solely for the selfish purposes of humanity. This has even led some ecological conservatives to challenge such purportedly anthropocentric views of Christianity (and in fact anthropocentrism in all religions), stating that all of life is equal on earth and that any tendency toward anthropocentrism should be met with condemnation. These criticisms raise two questions as central to the issue: (1) is Christianity of necessity anthropocentric, and (2) is the idea that Christianity supports the abuse of creation solely for human gain an ancient, and thus original, idea within Christianity?

First, we must consider the anthropocentric status of Christianity. Christianity is by definition Christ centered, and because Christ became Man, humans become a central focus of Christianity. Certainly, the creation stories in Genesis point to a human-centered creation; when God creates the world, only human beings are made "in the image and according to the likeness" of God. Most of the early Church Fathers do not turn away from a view of humanity as in some way a special part of creation, although as will be pointed out later, this involves a humanity that lives in harmony with creation as a steward of all things. An anthropocentric view of the world, then, probably cannot be avoided in Orthodoxy, and it is consistent with the Church Fathers. Nevertheless, a human-centered creation is not necessarily a human-exclusive creation, which leads to the second issue raised above.

The view that Christianity by nature permits the "use" (which allows the possibility of abuse) of the earth in order to serve humanity's needs is another component of the modern critique of Christianity by environmentalists. Many believe that this has been a component of Christianity since the beginning and that it has led over the centuries to a continual exploitation of the environment that has, in turn, led to the current environmental crisis. Often, ecological problems are placed squarely at the feet of Christianity, along with the call to usher in a post-Christian era in order to save the environment from Christian teachings. I want to maintain, however, that any Christianity that warrants the name cannot be exploitative of the environment and that exploitation is not a teaching of the ancient faith but rather is a recent innovation. Instead of promoting an abuse of the earth, the ancient Christian faith emphasized a correct relationship between humans and nature. Teachings and writings in the early Church Fathers that support a

harmonious relationship between human beings and nature point to an older Christian perspective that was lost during the Westernization of Christianity. This view does not remove the anthropocentric view of creation, but at the same time it points to the need for a proper relationship between humanity and nature as one of priesthood, of dominion (rather than domination), and of love.

Clear signs of early "proenvironmental" thinking abound in ancient Church Fathers, St. Maximus the Confessor, for example. Raising awareness of this may perhaps aid in removing both Christianity as such along with a false understanding of anthropocentrism from the list of "issues" in the environmental debate and allow a joint proenvironment action of Christians with others who accept traditional doctrine and who desire the preservation of creation. In addition to St. Maximus, there are other ancient Fathers (such as Dionysius the Aeropagite and St. Gregory of Nyssa) that can be called upon as witnesses of the early church attitude, an attitude that includes anthropocentrism but only as understood within a harmonious relationship between humanity and nature.

Radu Bordeianu examined the writings of St. Maximus and the ecological movement in an article that puts forth the idea that St. Maximus's writings had relevance for environmental protection.[2] In particular, he focused on St. Maximus's theology of the *logoi* and his ideas about movement in creation, where all of creation moves toward its origin, a message strongly ecological in its intention. His view is that St. Maximus considers that Adam was unfaithful in his responsibility to be a true priest of creation; part of this is based in an inability to connect the five divisions within the world. These tensions or divisions Thunberg defines as created and uncreated, intelligible and sensible, heaven and earth, paradise and the inhabited world, and male and female.[3] Bordeianu notes that sin made Adam incapable of fulfilling his role of priest of creation but that Christ the New Adam restores that role to its proper place.

This proper role as priest(s) of creation places humans as a bond of creation to God: as the part of creation that can offer praise and sacrifice to God. Each human being must serve as a priest uniting all things to one another and to God. Human beings are the parts of creation that are both spiritual and earthly, feet on the ground, head turned up to heaven, and thus in prayer humanity can be mediator, protector, and unifier.[4] Von Balthasar, reflecting on St. Maximus's writings, similarly points out that not only is humanity the mediator of creation but that "if the Church is a '*world*,' the world is also a cosmic Church whose '*nave*' is sensible creation and whose '*choir*' is the world of intelligible realities."[5] This puts humanity at the center

of creation, which remains consistent with an anthropocentric view of creation, but at the same time this points to the responsibility that humanity has for creation. It provides a more balanced approach to humanity's relationship to creation than either of the polarizing perspectives mentioned above (exploitation versus ecologically antianthropocentric tendencies).

The ideas expressed by the early Fathers of the Church who universally supported an anthropocentric view of creation point to the fact that the "abuse" of the environment is not inherent to the anthropocentric model. On the contrary, because exploitation is incompatible with humanity's priesthood, abuse of the rest of creation removes the title of "man as a center of creation" from those who commit this perversion of the divine plan. The anthropocentrism of the early Church Fathers is not the same as the idea of humans as the only important part of creation, the literalist view with which anthropocentrism is equated today.

Ecology and Evolution Defined

Ecology is the scientific study of the distribution of life and how both the distribution and the abundance of individual life forms are affected by the interactions of organisms with their environment. The term is derived from the Greek words *oikos*, meaning household, and *logos*, here meaning knowledge or study. It is, then, the study of the human "household" (the earth and its environment), and the way in which interaction with the environment plays a role in the survival and development of living organisms has become the context of modern ecological study. The environment within which an organism lives includes physical factors, such as sunlight and climate, that comprise the habitat of the species. In sharing the same biotope with the rest of its own population as well as with the populations of other species, an organism is a part of a wider biological community. The term "ecology" was first used by Ernst Haeckel in 1866 to describe "the comprehensive science of the relationship between the organism and its environment." It is highly interdisciplinary, with interactions among fields including geology, geography, biology, population dynamics, and statistics. Eugenius Warming (1841–1924) is considered to be the founder of the field of ecology as a separate discipline of biology.

Biological evolution is most simply defined as descent with modification. Evolution as a biological theory was first proposed by Charles Darwin, a British naturalist who explained that species develop over time and that they have developed from a common origin. His two most important works are *On the Origin of the Species*, first published in 1859, and *The Descent of Man,*

and Selection in Relation to Sex, published in 1871.[6] The major tenets proposed by Darwin and accepted by the mainstream scientific community today are that there is a common ancestry for all of life on earth, that species develop through variations in form (now known to be the result of inheritable mutations), and that natural selection determines variation and drives speciation. At the time, Darwin's books were controversial both from the public viewpoint and from a religious perspective. Influenced by the Church of England, the British scientific establishment reacted against these works at the time, although this softened into an uneasy acceptance over the following decades. Eventually, even the Roman Catholic Church took a proevolution perspective, in part through the work of such noted scholars as Teilhard de Chardin and others, and these views were supported by several recent popes.

Evolution was originally presented as a scientific theory, a logically self-consistent model describing the behavior of a natural phenomenon originating in and supported by observable facts. Like all other scientific theories (such as the theory of gravity and the theory of relativity), evolutionary theory is formulated, developed, and evaluated according to the scientific method, which seeks to explain phenomena in the material (but not the spiritual) realm. The scientific method, which is used to test a scientific theory, is not radically different from a rational attitude that is used in many aspects of everyday life; for example, the fire inspector attempting to uncover the cause of a fire and the detective trying to solve a crime both use approaches similar to the scientific method.[7]

The scientific method is characterized by several major features: (1) it uses an objective approach, where the goal is to observe events as they are without falsifying them; (2) the results (if produced experimentally) must be reproducible in a broad sense in laboratories anywhere in the world; (3) there is an interplay of inductive reasoning (from specific observations and experiments) and deductive reasoning (reasoning from theories to account for specific experimental results); and (4) the objective of the work is to develop broad laws that become part of humanity's understanding of natural laws (such as the theory of gravity developed by Isaac Newton). The definition of a scientific theory, which is generally considered to be a paradigm that is proven or assumed to be true, is in marked contrast to a dogma, which is a principle that is merely proclaimed as true. It is at the core of science to strive for openness to change; this is imposed on it by the utilization of the scientific method. Thus science is required to refrain from making dogmatic claims and must rely instead upon hypotheses, which are assumptions used as the basis for investigation or argument and which

can be tested. These hypotheses when all lined up together should support their originating theory.

The Link between Ecology and Evolution

The link between ecology and evolution has long been recognized in academic circles; many universities have a single department of evolution and ecology, and studies in one discipline generally require coursework in the other. They are usually viewed as two different sides of organism-environment interaction, with evolution studying the interaction from the perspective of the population over time and ecology examining this same interaction from the perspective of the environment over time. There are numerous examples of how environment affects evolution and how organisms affect environment. The following examples view humans as a species in its interaction with the environment.

Perhaps one of the simplest examples of the interplay of biological environment and life is evident in the Great Chinese Famine, which occurred between 1958 and 1962. In China at the time, there was a poor crop yield in the cooperative farms. The Chinese government blamed the sparrows for the famine, believing they were eating up all the food crops, and as a result an organized and massive destruction of sparrows was undertaken. However, the sparrows had kept the locust population in check because they feed on insects, and as a result of the near extinction of sparrows in 1958, the locust population massively increased, destroying the crops at a high rate. This exacerbated the famine and caused a large loss of human life. There had been a balance between locusts and sparrows, but once the sparrows were removed from the ecosystem by humans, the locusts, with their natural predator missing, could feed on the crops unchecked.[8]

An example that illustrates the role of environment in evolution is the example of sickle cell anemia and its relationship to malaria in humans. The sickle cell disease is caused by a single mutation in both copies of the beta globin gene, which encodes a protein that transports oxygen in red blood cells. The genetic mutation is a change in a single DNA nucleotide that results in an atypical hemoglobin molecule called hemoglobin S, which can distort red blood cells into a sickle, or crescent, shape. People with one healthy and one hemoglobin S gene have normally shaped discoid red blood cells. However, such red blood cells are resistant to malaria, which is endemic in Africa and areas of the Mediterranean and had existed in southern parts of the United States as well. People that have two copies of the hemoglobin S gene die early of complications from sickle cell anemia, and in re-

gions where malaria is found people with two copies of the healthy version of the gene die of malaria. In the present-day United States, Western Europe, and other areas where malaria is not found, there is no advantage to having a copy of the hemoglobin S gene in the genome; it is only in areas where malaria is endemic that having one (but only one) of the sickle cell genes is actually useful. When the gene is taken out of its environmental context (regions where malaria is endemic), it loses its benefit.

These two examples illustrate the interaction between environment and evolution on the human species and demonstrate how difficult it is to understand one without the other. Rejection of the ideas of evolution, then, can lead to a misunderstanding of the relationship between organisms and their environment and may contribute to an ambivalent attitude toward environmental concerns. Antievolution sentiment may then grow into antienvironmental attitudes. In general, Orthodox Christians do not accept an invariably literal understanding of scripture and therefore need not have a problem with the concept of evolution. One modern Orthodox scholar who dealt extensively with the topic of evolution, nature, and theology is Fr. Sergius Bulgakov.

Causality and Bulgakov

The concepts of eternity and the creation of time are also linked with questions about causality. Much of early science was oriented toward understanding the creative activity of God, and it was the general belief that understanding nature would lead to a greater understanding of its Creator. Mendel, a monk of the Roman Catholic Church, pursued genetics as a way of understanding nature and thereby gain insight into God's creation. Galileo studied the heavens to gain a better understanding the One who created the universe. These early scientific perspectives were linked to the "two-book" model for understanding science and religion—with the "book of nature" and "the book of scripture" being two different approaches of understanding God and His creation. God was seen as the source of all causality, and creation was a reflection of God's action in the universe. Modern science has distanced itself from any concept of a Creator, focusing instead on understanding intermediate causes or "subcausalities." Nevertheless, we are still driven to search for the causes of events. Tolstoy in *War and Peace* acknowledged this when he wrote: "The human intellect cannot grasp the full range of causes that lie behind any phenomenon. But the need to discover causes is deeply ingrained in the spirit of man."[9] This drive to find causes is found in all areas of investigation—history, where we try to uncover the cause of

events in hopes of not repeating mistakes; psychology, where we hope to find the cause of mental disorders and thereby cure the patient; medicine, where we hope to find the underlying cause of disease and give the appropriate therapy. The overall goal of science is to provide useful models of material reality, and this is naturally driven by the cause-effect relationship.

Scientists look at bacteria and viruses as causes of infectious diseases, psychological trauma as causes of mental disorders, and so forth, but they no longer attribute any aspect of this to God. While many people have complained that science is wrong because it does not consider God as a cause, in fact, science studies the material world and not the spiritual world. Science attempts to be objective, with the goal of providing a language and approach that is unified among all scientists and allows for communication across the globe and even across disciplines. When a biologist in Chicago and a biologist in Japan are talking about a particular response to radiation, they both know what it takes to define that response and whether the appropriate criteria have been met to establish that it is in fact a response to radiation. When journal papers are being peer reviewed for publication, often the comments on the paper will be similar regardless of whether the reviewer is from Germany or Canada.

While many feel confused or even angered by the fact that scientists can discuss creation without putting God into the story, these same people do not understand that there is sometimes humility in not discussing God. There is a limit to what science can define, and that limit is based on the objective scientific approach of performing hypothesis-driven experimentation on the material world alone. God is not subject to such testing, and therefore whenever the scientist would be bringing God into the discussion, it would be based not on scientific experimentation but rather on his or her personal belief system. This belief system is not amenable to scientific experimentation but rather is based on personal faith and experience. If scientists were to put God into their scientific results, one wonders what the basis for this would be and what criteria would be used for including some pieces of faith-based information and not others. In fact, it could be argued that much of the animosity in the science-religion discussion is based on scientists overstepping their bounds and delving into faith-based concerns.

A recent conference, "Beyond Belief,"[10] held by scientists to discuss the science-religion interface demonstrated how challenging it is to find a middle ground between believing and nonbelieving scientists. The misleading aspect of this discussion occurs when prestigious scientists such as Stephen Hawking or Richard Dawkins take strong stands against religion, leading one to conclude that they are doing this based on scientific evidence rather than

their own personal beliefs. The issues of causality understood from a scientific perspective and as approached from a theological perspective become confused. As modern science finds scientific causes and pushes the cause of events (for example, the beginning of cosmos) further and further from God, God appears to be smaller, and one wonders whether God is even there at all.

One early proponent of "God as the cause" was Thomas Aquinas, who argued that God is the Primary Cause of all things:

> There must be found in the nature of things one first immovable Being, a primary cause, necessarily existing, not created; existing the most widely, good, even the best possible; the first ruler through the intellect, the ultimate end of all things, which is God.[11]

This argument of Aquinas has become a hallmark for the Western Church in identifying the relationship of God and Creation with God as the Primary Cause and other causes as being secondary. At first examination, this statement of God as the Primary Cause of all seems well founded in reasoning and understanding, and in fact God could be posited as the Primary Cause of all things, with science examining secondary causes. This, however, may lead to erroneous conclusions.

Drawing upon the insights of patristic Christianity, Sergius Bulgakov takes this perspective to task, arguing that "The One Who Causes" is not a proper designation for God.[12] He bases this on how we understand the word "cause." When humans cause things to happen, we think of these as "cause-effect" relationships: for example, turning the key in the car ignition causes it to start, or exposure to influenza virus causes the person to develop the flu. This is not the proper way to think of God's relationship with the world. Bulgakov argues that the proper description of God's relationship to the world is that of Creator and creation, and this is not the same as "The One Who Causes." If human creativity somehow entails a microrelation to God's creativity and creative activity, then perhaps we can understand God as Creator through considering the creative acts of humans rather than considering causative facts.

A comparison of cause-effect actions with creative actions shows that these are actually quite different. Creativity is often considered to be a mental activity that involves the generation of new ideas or new concepts, although there is great difficulty in defining it and its features. The source of creativity has been attributed to a variety of different processes (social environment, cognitive processes, divine intervention, serendipity, etc.) and is usually multidimensional in nature. Creativity is not something that can be dictated or even defined, nor is it something that can be legislated, such as:

"Today I will be creative." This is much different from a cause-effect relationship where the end result can be easily attributed to a specific action. A person can easily say "I will make an X" and proceed to do it if it involves no inspiration, but such is not the case with creation and creative thinking. While a person can indicate that they will design a particular experiment or a particular building at a given time, the inspiration for a creative component to that work cannot be dictated and may come when least expected, or it may never come. Thus, we often hear people claim that their best ideas (creative moments) happen in the shower or when they first wake up in the morning. If one then extrapolates from human experience with creativity, it becomes clear that creativity and cause and effect are very different things.

Bulgakov provides a critique of certain aspects of Western theology, including arguments against the doctrine of first and second causes. He prefers instead a concept of "co-imagedness," in which the creatures contain the living image of the Creator, and he argues that the world does not have a cause since it was created and that God is not the cause of the world but rather is the world's Creator and Provider. In this sense, the world becomes a correlative unity understood by its connection with its Creator rather than an autonomous and unrelated entity. We can also easily understand this stance from our own creative experiences—things we caused to be made are much less important to us than those we created by drawing upon our inspiration, our originality. Such latter things we are proud of, and we want to be measured by them—in some way, they are us ourselves. There is another meaning to be had from the word originality—when we create and are the origin of a creation, we are truly original. God as Origin of all is infinitely more than a cause. Bulgakov reasons that the proper relationship of the Creator and creation is expressed as an icon:

> In general, the idea of the Creator and creation does not need to be translated into the language of mechanical causality, for it has another category, its proper one, that of co-imagedness, since the creature contains the living image of the Creator and is correlated with Him. . . . The world does not have a cause, since it is created; and God is not the cause of the world and not a cause in the world, but its Creator and Provider. God's creative act is not the mechanical causation through Himself of the world's being, but His going out of Himself in creation.[13]

This co-imagedness fits well with the Genesis context of humans being made in the image and according to the likeness of God. Humans bear the imprint of their Creator, and therefore they are icons of God. We acknowledge this

liturgically by censing the people during all liturgical services, censing the image of God in each person.

Bulgakov is one of the few Orthodox theologians to have addressed questions of the interaction of God and the world by taking into consideration modern scientific thinking about evolution. There are also several others who have addressed the issue of the interface of science and religion in contemporary Orthodox thought.[14] They too have used a theological approach to addressing questions of environment, anthropology, and creation, and while much of their thinking touches directly on evolutionary biology and its meaning in a religious context, they have not had this topic as their major goal. While Bulgakov's writings are often tangential to this topic, he has also specifically examined the theory of evolution and its implications for Orthodoxy. His book *The Bride of the Lamb* tackles the issue of the creation of the world "out of nothing" and uses this as an opportunity to introduce his view of Sophianicity[15] and its role in God's relationship to humanity and to the world.

Bulgakov deals with a variety of problematic questions for the "science and religion" discussion. Was there a time when God was not Creator? Bulgakov considers that the power of creation is so integrated into the Godhead that God cannot fail to be the Creator, and thus God cannot be understood as separated from Creation. God never began being Creator because God is Creator eternally. God's interaction with the world is predominantly creative, not mechanical. Creation is an ongoing process that has not ended and will not end. Bulgakov sees this as being consonant with views of evolution where the life continues to be changed, and hence created, even now.

How can one understand the eternity of creation and the temporality of its being? Is there a beginning of time? Bulgakov considers that eternity is accessible to creatures only through temporality and the overcoming of temporality. He notes that the symbolism of the six days of creation places the creation of time itself only on the fourth day, that is, after the fullness of already existing creaturely life has been implanted. Time exists for humanity, who, by nature, has consciousness and knowledge of time. The world was not created in time—time was created in the world, but this creation was supratemporal, not extratemporal. Bulgakov states: "Even if one could seek the *beginning* of creation, it would have to be perceived not outside, not in time or in space, but inside, in the character of creaturely being, and in the last analysis, in divine being."[16]

To what extent is humanity God's creation? Bulgakov's view is that humanity is created by God's call into being in some cosmic sense but that there is also an extent (paradoxically) to which humanity is its own creator

brought about by the freedom of choice given to humanity by God. Human freedom comes with a creative power that is capable of self-determination, while humans are considered "noncreaturely-creaturely beings, created and self-creating," intended to become a god by grace or even a created god. This is balanced by each person's personal acceptance of universal sin, which can be different from one person to another, a concept that Bulgakov favors over traditional views of original sin. Furthermore, this position is tightly bound to his understanding of evolution.

What does acceptance of evolution mean for our understanding of an original Edenic state of humanity on earth? Bulgakov notes that an evolutionary outlook on human origins is diametrically opposed to any view of an original state of humanity that is associated with Eden and a perfect life. This point is expounded in detail as the contrast between the language of empirical history and metahistorical events is described. Bulgakov considers the idea that, while evolution takes place as a series of apparently capricious events, there is an inner progression of creation that allows for the actualization in time of a prior reality that is beyond creation. While evolution defines the "how" of creation, the "what" of creation is defined by this inner progression that reflects a different reality, a reality that existed before this reality, a reality that humans "remember" as an Edenic state and as God's garden. So, just as God is always a Creator, the extratemporal creation that God has always created is always the goal and the memory of the material creation, its Eden. Bulgakov states: "although man is phylogenetically connected with the animal world by his animal nature, his origin is not merely an evolutionary achievement, but an express and new divine creative act that is *outside* the evolutionary process. It is something *new* in creation."[17] The appearance of a godlike spirit in humanity is a mystery that is not understood empirically, and evolution does not attempt to define when or how this spirit first appeared in humans or humanlike creatures, nor is it supposed to.

Concluding Thoughts

The work of Bulgakov demonstrates one way in which the approach of ancient Christian thought can offer us powerful insights into the natural environment, especially with respect to contemporary debates and considerations. It also shows how Christian "anthropocentrism" need not be harmful to the environment. As science and technology become more prominent and as concerns about ecological and technological problems loom, the early Church Fathers can be used as promising guides for understanding humanity's proper relationship with nature, and this relationship is best understood

as mediator, priest, contemplator, and unifier, all of which help us strive for unity with God, a goal for which we were created but for which we must struggle. This is based upon a worldview that is anthropocentric but not anthropoexclusive, and it must seek for harmony with nature in order to be consistent with the teachings of the ancient Christian Church. Further, evolution and ecology are tightly linked, and separation of the two only leads to an inadequate understanding of nature and an inappropriate orientation toward the environment. Evolution as a concept should be acceptable to Orthodox Christians, particularly in light of the fact that the Orthodox generally do not accept a literal understanding of Genesis. Acceptance of evolution, ecology, and the ancient faith tradition should all facilitate a more balanced relationship of humanity with the world that surrounds us.