

THE COMPATIBILITY OF THE PRINCIPLES OF BIOLOGICAL EVOLUTION WITH EASTERN ORTHODOXY

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Introduction: Biological Evolution Defined

Biological evolution is defined as descent with modification. This definition includes both small-scale evolution (such as changes in the frequency of a particular gene within a population from one generation to the next) and large-scale evolution (such as the descent of different species from a common ancestor over many generations). Evolution as a biological theory was first proposed by Charles Darwin, a British naturalist who explained that species develop over time and that they developed from a common origin. His two most important works are *On the Origin of the Species*¹ and then *The Descent of Man, and Selection in Relation to Sex*.² The major tenets proposed by Darwin and accepted by the mainstream scientific community to this day were that there is a common ancestry for all of life on earth; that species developed through variations in form (now known to be the result of inheritable mutations); and that natural selection selects variations and drives speciation. At the time, the books were controversial both from a public view and from a religious perspective. The Church of England's establishment reacted against the book at the time, although this view softened into an uneasy acceptance over the ensuing decades. Even the Roman Catholic Church eventually took a pro-evolution perspective through the work of such noted scholars as Teilhard de Chardin and others.

- 1 Charles Darwin, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (1st ed.) (London: John Murray, 1859).
- 2 Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (1st ed.) (London: John Murray, 1871).

Evolution was originally presented as a scientific theory: a logically self-consistent model describing the behavior of a natural phenomenon originating and supported by observable facts. Like all other scientific theories (such as the theory of gravity, the theory of relativity, etc.), evolutionary theory is formulated, developed, and evaluated according to the scientific method. Often in everyday language, people equate the word “theory” with “speculation” or a “conjecture.” In scientific practice, however, the word theory has a very specific meaning—it is a model of the world (or some portion of it) from which falsifiable hypotheses can be generated and verified (or not) through empirical observation of facts. In this way, the concepts of “theory” and “fact” are not opposed to each other, but rather exist in a reciprocal relationship. While it is a fact that an apple falls from a tree, it is the theory of gravity that explains it. 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.³ The scientific method is characterized by several major features: (1) it uses an objectivity in 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 observation 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 proclaimed as true. It is at the core of science to fight hard to be open to change imposed on it by the utilization of the scientific method. For that reason vocabulary of science is cautious: science has refrained from making dogmatic claims;

³ Arthur Peacocke, *Paths from Science Towards God: The End of All Exploring* (Oxford, UK: Oneworld Publications, 2001), 26.

instead, it relies upon hypotheses, which are assumptions used as the basis for investigation or argument, and can be tested. Proven hypotheses support and modulate their originating theory.

The textbook definition of evolution describes it in a broad sense as a process of change, but biological evolution itself is much more limited in definition. Douglas J Futuyma in his book *Evolutionary Biology* makes the following distinction:

In the broadest sense, evolution is merely change, and so is all-pervasive; galaxies, languages, and political systems all evolve. Biological evolution ... is change in the properties of populations of organisms that transcend the lifetime of a single individual. The ontogeny of an individual is not considered evolution; individual organisms do not evolve. The changes in populations that are considered evolutionary are those that are inheritable via the genetic material from one generation to the next. Biological evolution may be slight or substantial; it embraces everything from slight changes in the proportion of different alleles within a population (such as those determining blood types) to the successive alteration that led from the earliest protoorganism to snails, bees, giraffes, and dandelions.⁴

Biological evolution, then, does not act upon individuals but rather on populations.⁵ The fate of individuals can be affected by their traits, but individuals do not undergo biological evolution, changes we undergo in life may perhaps be called “personal evolution,” but not biological evolution. A natural unit enacting biological evolution is the population. A population acts essentially as a collection of genes and genotypes that evolves, and the evolution of the population can be expressed as a change in the frequency of certain genes and genotypes in the population. For example, the prevalence of lighter

4 Douglas J Futuyma, *Evolutionary Biology* (Sunderland, MS, Sinauer Associates, 1997), 751.

5 John M Smith and Eörs Szathmáry, *The Origins of Life: From the Birth of Life to the Origin of Language* (New York: Oxford University Press, 1999), 81; David S Wilson, *Darwin's Cathedral: Evolution, Religion, and the Nature of Society* (Chicago: The University of Chicago Press, 2002), 9–18.

skinned individuals in dusky climates and darker skinned individuals in sunny climates resulted from a selection of gene combinations balancing vitamin D deficiency and protection against UV light induced mutations; since neither of these issues is instantly lethal and they are mutually opposed to each other, selection pressure over many generations leads to the skin color gradient between equatorial Africa and Sweden. It is not the purpose of this work to provide a proof for biological evolution. Despite recent challenges,⁶ there is an overwhelming body of support for biological evolution in the scientific literature that comes from protein and DNA data, from the fossil and geological records, physiologic and functional studies, and much more (see for example, any textbook of biology currently used in universities). Theodosius Dobzhansky, the son of an Orthodox priest, a practicing Orthodox Christian, and a noted evolutionary scholar wrote the following:

Let me try to make crystal clear what is established beyond reasonable doubt, and what needs further study, about evolution. Evolution as a process that has always gone on in the history of the earth can be doubted only by those who are ignorant of the evidence or are resistant to evidence, owing to emotional blocks or to plain bigotry. By contrast, the mechanisms that bring evolution about certainly need study and clarification. There are no alternatives to evolution as history that can withstand critical examination. Yet we are constantly learning new and important facts about evolutionary mechanisms.⁷

Biological evolution (throughout the remainder of this text referred to as evolution) is the unifying theory of biology. Results of evolution shape the lives of people in almost every respect of everyday life. Agriculture and medicine have used the principles of evolution for centuries before that word was ever used for the first time. Regardless of their attitude toward education about evolution,

6 Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (Free Press, 1998).

7 Theodosius G. Dobzhansky, "Nothing in Biology Makes Sense Except in the Light of Evolution," *American Biology Teacher* 35(1973):125–29.

the federal governments of most countries utilize the knowledge about evolution engrained in every aspect of life sciences. Drug and vaccine testing for humans require prior testing in non-human primates because they are the genetically closest species; while those working with primates receive vaccinations equivalent to those for travelers to distant countries. The evolutionary proximity of species leads to similar physiology and cell biology.

There is a unity that exists in creation that is a direct result of the common evolution of all of life on earth within the confines of our common yet varied environment.⁸ Life on earth all shares the same elements (carbon, nitrogen, trace metals), the same processes (cell division, replication and repair of DNA, transcription of RNA, translation of proteins), even the same genetic code. These shared processes are sufficiently complex to make any two living organisms more similar to each other than anything non-living in the universe. At the same time, life forms in different parts of earth have access to and use for survival different types of nutrients and energy sources and are exposed to different environmental obstacles. Together, these challenges create selection pressure which leads to specialization and speciation—features that make for a healthy organism in the equatorial rain forests are inadequate for survival in an oceanic thermal vent. Thus, mankind and every other species share in unity as they evolved into diversity. Both unity and diversity of life have profound theological significance that is missed if we do not incorporate the theory of biological evolution into contemplation of Creation. Unity helps humanity to see the relationship of all creatures, indeed our relationship with the earth itself. The diversity of creation helps humanity appreciate the need for all creatures, all of life, all niches and environments to support each other and our planet. With both of these concepts come a profound ecological consciousness and a view of humans as priests of creation.

8 Gayle E. Woloschak, *Beauty and Unity in Creation: The Evolution of Life* (Minneapolis, MN: Light and Life Publishing Co., 1996).

Evolution and Orthodoxy

When medieval scholars considered that science formed the “Book of Nature” and that religion was reflected in the “Book of Scripture,” it was agreed that these two books must be consistent. While this “two book mode” has long been shown to be too simplistic to define the relationship between science and religion, that point still has value. God created nature and there can be no inconsistencies between his Creation and what the Church claims. John Zizioulas, in his book *Being as Communion*, compared two different approaches to truth from scientific and religious perspectives:

Science and theology for a long time seemed to be in search of different sorts of truth, as if there were not one truth in existence as a whole. This resulted from making truth subject to the dichotomy between the transcendent and the immanent . . .⁹

However, one could argue that with the development of specialized scientific methods the “scientific” truth becomes less and less apparently immanent. That is certainly the case with biological evolution. Nevertheless, the evidence in support of biological evolution is found at every level of biological study; biology, medicine, and agriculture depend upon it and every achievement in these fields is made possible by an ingrained comprehension of evolution, even in the pre-Darwinian past when such knowledge was not a conscious one. Conversely, every attempt at “science” guided by any other principle has failed, often with grave consequences for humanity (e.g., the devastating “sparrow wars” era in communist China that killed tens of millions of people).

There is great confusion within the Orthodox Church about an official contemporary position on the theory of evolution. One Orthodox website¹⁰ has grouped the various positions into two main categories—(1) compatibilists, who hold that science and theology are compatible and view them as complementary

⁹ John D. Zizioulas, *Being as Communion* (Crestwood, NY: SVS Press, 1985), 119.

¹⁰ Evolution on OrthodoxWiki, Orthodox Internet Services <http://orthodoxwiki.org/Evolution>.

revelations of God and (2) incompatibilists, who hold that science is incompatible with faith and argue that science is philosophically based on a kind of naturalism that is incompatible with any religion, or that God's revelation as given by Scripture is inerrant in every detail and therefore supersedes anything that science might find.

As it has been noted in many sources, modern science finds its roots in the Enlightenment, and therefore no Ecumenical Council of the Church has ever considered how to integrate science and theology. However, perhaps we can look at this as an issue of the validity of teaching(s) in apparent contradiction with the teachings of the Church. One could even argue that the Gospels themselves are contradictory, so that the contemplative approach to understanding them would be enforced.

Among the Church Fathers, many have clearly expressed a view against the literal interpretation of Scripture. St Basil the Great spoke strongly against those who were straining to the letter of the text and missing the spirit of the Scripture, calling them "technologists not theologians." St Maximus the Confessor warned that a literal interpretation of Scripture can be dangerous for the spiritual life:

... a person who seeks God with true devotion must not be dominated by the literal text, lest he unwittingly receives things pertaining to God, but not God, that is, lest he feel a dangerous affection for the words of Scripture instead of for the Logos.¹¹

Recent discussion on the issue has been mixed. There are probably more authors writing in support of compatibility of Orthodox teachings and evolution than there are "incompatibilists." However, in general, there is no firm stand on this issue from the Orthodox Church, and that has led to much confusion. Unfortunately, this also led to an infiltration into the Church of fundamentalist tendencies that have been foreign to Orthodoxy in the past,

11 St Maximos the Confessor, "Four hundred texts on love: Second Century," *The Philokalia* Vol. 2, Compiled by St Nikodemus of the Holy Mountain and St Makarios of Corinth, tr. and ed. by G.E.H. Palmer, Philip Sherrard, and Kallistos Ware (London: Faber and Faber, first published in 1981, reprinted 1984), 155.

coming predominantly from Protestant Evangelicals. Also recently, a literalist interpretation of Scripture surfaced in predominantly Orthodox countries such as Russia, Serbia, and Ukraine, which have recently been rescued from pro-communist regimes. Whether this novelty is a result of infiltration or an outcome of the interruption of Orthodox tradition in these countries remains to be discerned.

One modern Orthodox scholar who could be considered a compatibilist is Christos Yannaras. He attempted to deal with the evolution question in his book *Postmodern Metaphysics*.¹² Most of this book relates to a greater understanding of physics and its relationship to science, religion, and the modern world. Nevertheless, biological evolution is also mentioned, and an attempt is made to segregate it from a materialistic perspective. Unlike Bulgakov,¹³ however, Yannaras argues that God is the Principal Cause of all things, and sees the universe as caused rather than created, using both terms almost interchangeably. A major concern with many of his views, particularly on biological evolution, is that they do not reflect a clear understanding of science. In one section, Yannaras lists 35 points that he entitles “The ‘Logical Place’ of the Theory of Biological Evolution.” Many of the points raised in that section are not scientifically accurate, and as a consequence many of his arguments fail. For example, in point two he states: “... Evolutionary theory says that the human spirit does not constitute a discontinuity in the evolution of living beings.”¹⁴ This is not accurate; evolutionary theory does not talk about the spirit, and it is a mistake to make assumptions based on this “omission.” Elsewhere, in point six, he draws a series of conclusions relating self-preservation and survival of the fittest with evolution of the human brain. His statements do not flow logically, because in biological evolution survival of the fittest is based on survival of populations and is not really tied to self-preservation, but rather to the reproductive instincts. In fact, there are many examples in nature when parents

12 Christos Yannaras, *Postmodern Metaphysics*, tr. Norman Russell (Brookline, MA: Holy Cross Orthodox Press, 2004).

13 Sergius Bulgakov, *The Bride of the Lamb*, tr. Boris Jakim (Grand Rapids, MI: Wm B. Eerdmans Publishing Co., 2002), 33–43; 220–250.

14 Christos Yannaras, *Postmodern Metaphysics*, 73–82.

or siblings die as protectors of other population members. Natural selection drives the survival of the species through (re)modeling of a population, creating new populational genetic makeup, rather than killing (or not) any particular individual. Yannaras takes on the concepts of chance and necessity used by others (see for example, Peacocke¹⁵), but again his understanding of these concepts is not really accurate from a scientific perspective, especially regarding the role of chance in evolution and creation. His description of “The Logical Place of Chance” states:

The world as a product of chance is a contradictory proposition. It proposes the inexplicable as an explanation. It interprets non-sense as sense.¹⁶

However, in evolutionary biology as well as non-biological sciences, the term “chance” actually communicates that a phenomenon under observation can be associated with some degree of probability. “Chance” is not inexplicable or nonsensical—it depends on the prior situation from which several avenues open, each with its own probability. Perhaps one could even argue that chance has a firm theological foundation in the concept of divinely prescribed freedom that is so engrained in Orthodoxy. Yannaras is a theologian who has contributed a great deal to theological arguments putting theology in the context of post-modernism, Western thinking, etc.¹⁷ with great thought and criticism of the modern world.

15 Arthur Peacocke, *Paths from Science Towards God: The End of All Exploring* (Oxford: Oneworld Publications, 2001); Arthur Peacocke, *Evolution: The Disguised Friend of Faith?* (Philadelphia: The Templeton Foundation, 2004); Arthur Peacocke, *Creation and the World of Science* (Oxford: Oxford University Press, 2004); Arthur Peacocke, *All That Is: A Naturalistic Faith for the Twenty-First Century* (Minneapolis: Fortress Press, 2007); Gayle E Woloschak, “Chance and Necessity in Peacocke’s Scientific Work,” *Zygon* 43 (2007): 73–81.

16 Christos Yannaras, *Postmodern Metaphysics*, 67.

17 Christos Yannaras, *The Freedom of Morality* (Crestwood, NY: SVS Press 1984); Christos Yannaras, *Elements of Faith: An Introduction to Orthodox Theology* (Edinburgh: T&T Clark Ltd., 1991; Christos Yannaras, “The Church: A Mode of Being That Can Conquer Death,” *Service orthodoxe de presse* 169 (1992): 25; Christos Yannaras, *On the Absence and Unknowability of God: Heidegger and the Areopagite* (London: T&T Clark International, 2002).

However, his attempt to place theology in the context of modern scientific thinking is flawed by the fact that he does not have a clear understanding of the scientific view and therefore cannot adequately critique it.

Among modern Orthodox scholars who critiqued a literal interpretation of Genesis, the foremost is Fr Sergius Bulgakov. Most notably, his book *The Bride of the Lamb* examines the science-theology interface from an Orthodox perspective. He examines Genesis not as history *per se*, but rather as a meta-history or even hyper-history:

To assert that the stories [of Genesis] are “history” in the very same sense as empirical history is to do violence to their direct meaning, to subject them to critical mutilation ...¹⁸

The spiritual danger of missing the point of the biblical text is of particular concern when examining the Genesis stories. These texts are rich in meaning at the theological level, while a literal way to deal with this text is to believe that creation was made in six days. A contemplative way to use this text is, for example, to ponder Creation as good and creation of the good and how this relates to evil in the world, etc.

Another issue that has been raised by evolution is how to understand the story of Genesis from the perspective of Eden. What is Eden if not the original state of humans? How can we reconcile it with the origin of humans from ape-like common ancestors? Bulgakov, too, saw this issue as a stumbling block for contemporary thought, and concludes:

One can say that the remembrance of an edenic state and of God’s garden is nevertheless preserved in the secret recesses of our self-consciousness, as an obscure anamnesis [calling to mind] of another being.¹⁹

What Bulgakov is alluding to is that Eden is a state to which we strive in our personal future, and not in our species’ past. In the Liturgy of St Basil the Great, during the anaphora, the priest’s prayers call for

18 Sergius Bulgakov, *The Bride of the Lamb*, 170.

19 Ibid., 178.

a remembering of things yet to come, by remembering not only the things past—the crucifixion, the resurrection, and the ascension—but also by remembering (or calling to mind) those things yet to be, such as the Second Coming.

Yet another issue to contemplate regarding the human history comes from Nellas, who recently argued²⁰ that any examination of time changed after Christ came into this world. His coming also meant his merging with human history, and from then on time took on a different meaning: “The divine economy radically alters the natural division of time into past, present, and future, and introduces a different understanding of history.” This is now a history that God has entered and a history that was transformed, but at the same time, humanity was created for (or even at) this moment in history when Christ would enter it.

Among the contemporary “incompatibilists,” a most frequent motivation for an anti-evolution attitude is governed by the idea that the contemporary ultra materialism is somehow a byproduct of evolutionary theory. This stand, however, is not supported by a thorough review of the facts. Materialism is a philosophical concept, while biological evolution is a scientific theory: there is no obligatory connection between the two. Evolutionary theory was developed to explain biological evolution, and no other process of change. Its application to other areas such as social development, economic change, etc., is inappropriate, not scientific, and most often wrought with political agenda. For example, evolutionary theory was co-opted by Marxism as a political clutch for the radical atheism that was to become the heart of the Marxist movement. Arthur Peacocke, in his book *Evolution: The Disguised Friend of Faith*, notes the following:

... the recruiting of Darwinism into the struggle for socialism, atheism, and free-thinking by Marx and Engels tied evolution into a package which most theologians inevitably rejected.²¹

20 *Synaxis: An Anthology of the Most Significant Orthodox Theology in Greece Appearing in the Journal Synaxis from 1982–2002* (Montreal: Alexander Press, 2006).

21 Arthur Peacocke, *Evolution: The Disguised Friend of Faith?*, 24.

Again, evolution became tied up with arguments that were atheistic, although evolution itself is non-theistic *per se*, and makes no comments about God or God's relationship to creation. Today, in the American public arena, the evolution–anti-evolution debate is not tied up with science, but is once again polluted with politics. Pro-evolution often equates in people's minds with materialism, atheism, or break-down of the family, while anti-evolution is conversely equated with family values, spiritual dimensions, etc. This conversion of a scientific theory into a tool for fortifying either political agenda is a tragic disservice not only to science, but to the fearless religious contemplation which is a basic foundation of Orthodoxy. What unifies pure science and pure faith is the pursuit of truth, based on facts, theory, and practice, and, if "pure," devoid of political agendas. Inasmuch as either science or religion allows itself to be infiltrated by politics, they lose the interest in truth and become enemies both of self and of one another.

Evolution as a Tenable Concept

If we accept evolution as a scientific explanation of life's origins, and if Orthodox faith is willing to embrace this explanation, it is necessary to put some effort into understanding how this description of life's origins fits into Orthodox theological thinking. There are precursors of evolutionary thought in some of the Church Fathers that are consistent with an evolutionary origin for life. St Basil the Great, for example, in his *Hexaemeron*, describing the six days of creation, consistently mentions a continual creation and notes throughout that creation is not complete.²² Fr Sergius Bulgakov asks the question whether there can be a time when the Creator was/is not creating, establishing again the timeless nature of the creation event itself.²³ A renewing creation, a creation capable

22 St Basil the Great, *Hexaemeron, Nicene and Post-Nicene Fathers*, Volume 6, ed. P. Schaff & H. Wace (Grand Rapids, MI: William B. Eerdmans.1952), 52–107.

23 Sergius Bulgakov, *Sergius Bulgakov: A Bulgakov Anthology*, ed. James Palin & Nicholas Zernov (London: SPCK, 1972); Sergius Bulgakov, *Sophia: The Wisdom of God* (Hudson, NY: Lindsfarne Press, 1993); Sergius Bulgakov, *The Bride of the Lamb*, 31, 45.

of constant creation, fits well with the definition of evolution as a continual change, a descent with modification. Fr John Chryssavgis, in his book *Beyond the Shattered Image*, refers to the Church Fathers and their reflections on creation by noting:

Created nature is the only premise and promise for salvation or destruction; it is not a finished product, but a moving ground in a process of continuous self-transcendence and transformation.²⁴

St Gregory Palamas distinguishes between God's energies and God's essence, noting that this distinction defines the relationship between God and creation so that nothing is outside of God's realm; God's energies are experienced by creation while God's essence cannot be. This idea was re-discovered by some Western theologians including, for example, Arthur Peacocke,²⁵ but by and large this idea is not yet part of mainstream thinking even in the science-religion area.

While these sources *would* embrace evolution as an inherent quality of change of creation, the concept of evolution is necessary to place humanity in the context of the remainder of creation. A denial of evolution often leads to an exploitative approach to the earth and the earth's resources and finally human beings as well. If we do not see the relationship of humans to all of creation—that humans are supposed to be the caretakers—it becomes easier to destroy species and harm the environment, contaminating the earth and even space. Fr John Chryssavgis, in his book *Beyond the Shattered Image*, attributes this attitude in part to the fact that people may consider that a human person is apart from or even above the rest of creation. Moreover, if we see the creation as a mosaic of species-specific events, it is easy to segregate races of the human species and then nations and so on. Conversely, an acceptance of evolution

24 John Chryssavgis, *Beyond the Shattered Image: Insights into an Orthodox Ecological Worldview* (Minneapolis, MN: Light and Life Publishing Co., 1999), 85.

25 Arthur Peacocke, *Paths from Science Towards God: The End of All Exploring*; Gayle E. Woloschak, "Chance and Necessity in Peacocke's Scientific Work," *Zygon* 43 (2008): 73–81.

helps humans to see our proper place in creation—related to all species on earth, even related to the earth itself—and thus to see the necessary role we must play in protecting it. Respect for all life on earth that acknowledges the diversity among and within species is ecologically and morally sound and has been one of the basic tenets of Orthodoxy. St Maximus the Confessor wrote

... through the beauty, goodness and profusion of His intense love for everything, [God] goes out of Himself in His providential care for the whole of creation. By means of the supraessential power of ecstasy, and spell-bound as it were by goodness, love and longing, He relinquishes His utter transcendence in order to dwell in all things while yet remaining Himself.²⁶

If God is in every extremity of nature without change, then the differences among these “extremities” become irrelevant—the apparent changes through evolution are non-changes for God, and God’s care for creation is all-encompassing. If God found nature so important that it was worthy of redemption, then how can humanity cause the destruction of so much of it through our ecological ignorance and carelessness?

Laws of nature—gravity, mass/energy conservation, the various physical and chemical constants, the properties of the various “systems” as well as elements and compounds—are all deterministic properties that provide the universe with a structure and order much like the structure and order that we experience in the liturgy. The cosmic order is a form of cosmic liturgy, the cosmos doing “God’s work” by being what it is supposed to be and carrying out what is expected. Likewise, evolution is a natural order at the core of life on earth: the deterministic nature of the effect of mutations, in conjunction with the natural selection directs the changes experienced by the living beings of creation. All of this—the entire Creation—humans are expected to offer to God in the Church’s liturgy (“Your own of Your own,” etc.), recognizing God as Creator

26 St Maximos the Confessor, “Various texts on theology, the divine economy and virtue and vice: Fifth century,” in *The Philokalia*, Vol. 2, 281.

and mankind as created together with everything else. The task of man is to be the “syndesmos and gephyra, the bond and bridge of God’s creation” (St John Chrysostom quoted by Bishop Kallistos).²⁷

Evolution of life on earth has lasted billions of years and included many changes to the life on earth, because evolution depends upon a life-death cycle as one of the main operating forces of natural selection. Many species were formed, changed, and have vanished over the millennia, species with which we share at a minimum the same subcellular structures and processes. There is hardly any other topic of scientific study that so inspires the feeling of humanity’s transience as evolutionary biology, but this awareness and acceptance of it inspire the sense of unity with the rest of creation; moreover, we realize that the passage of time is necessary for the natural order of things.

At the same time, the Orthodox understand that time for God has a different meaning than it does for humans. Our understanding of divine eternity as outside of time is expressed through our liturgical language in the Church. The verb forms we use in the Church, the present tense in the perfective, remind and teach us that. Fr Sergius Bulgakov, in his book *The Bride of the Lamb*, says “There is and can be nothing in time that does not have its foundation in eternity.”²⁸ While we live in time, we also partake in eternity through the Church. This participation in eternity is a link with our Creator who also created time.

Causality and Bulgakov

The medieval “two book” model for understanding science and religion, as mentioned earlier—had the “book of nature” and “the book of scripture” as two different approaches for understanding God and his creation. God was viewed as the source of all causality, and creation as a reflection of God’s action in the universe. Much of early science, therefore, was justified by anticipation of broadening the understanding of God. Mendel, a monk of the Catholic

27 Bishop Kallistos Ware, *Through the Creation to the Creator* (London: Friends of the Centre, 1997), 8.

28 Sergius Bulgakov, *The Bride of the Lamb*, 227.

Church, pursued genetics as a way of understanding nature and thereby getting a view into God's creation. Galileo peered into the stars to understand the universe in hopes of better understanding the One who created it. Through such efforts, the issues of causality from a scientific perspective and those from a theological perspective become confused. Modern science has distanced itself from any concept of a Creator, focusing instead on understanding intermediate causes or "sub-causalities." God is not present in this equation. And, as modern science finds scientific causes and pushes the cause of events (e.g., the beginning of the cosmos) further and further from God (as described by the "God of gaps"), God appears to be smaller, and those who still insist on God as the ultimate cause worry about his primacy.

The drive to find causes is found in all areas of scientific investigation as a necessary ingredient: in history, where we try to uncover the cause of events in hopes of not repeating mistakes; in psychology, where we hope to find the cause of mental disorders and thereby cure the patient; in 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 reality, and this is of necessity research-driven by the cause-effect relationship.

Scientists look at bacteria and viruses as causes of infectious diseases, tectonic shifts as causes of earthquakes, etc., but scientists do not attribute any aspect of this to God. In fact, while many people have complained that science is wrong because it does not consider God as a cause, there is no theological justification for a view of God as the direct cause of small individual events. As science attempts to be objective, with the goal of uncovering a pathway or defining a chemical response, this provides a language and approach that are unified among all scientists and allow for communication across the globe and even across disciplines. When a biologist in Chicago and a biologist in Japan are talking about a particular cellular response to radiation, they both know what it takes to define that response and whether the appropriate criteria in a given instance have been met. When manuscripts are peer-reviewed for inclusion

in a particular journal, reviewers with the same expertise will often make similar comments on the paper, regardless of their national or religious orientation. While many feel confused and even angered by the fact that scientists can discuss creation without putting God into the story, these same people do not appreciate that there is 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. God is not subject to such testing, and therefore whenever the scientist brings God into the discussion, that is based not on scientific experimentation, but rather on his or her personal belief system. This belief system is not amenable to scientific experimentation, but is rather 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 faith-based information and not other. In fact, it could be argued that much of the animosity in the science-religion discussion is based on scientists over-stepping their bounds and delving into faith-based comments. A recent conference, "Beyond Belief" (see website²⁹) held by scientists to discuss the science-religion interface demonstrated how challenging it is to find a middle-ground between believing and non-believing scientists. The misleading aspect of this discussion occurs when prestigious scientists such as Stephen Hawking or Richard Dawkins take strong stands against religion, and one is led to believe that they are doing this based on scientific evidence rather than on their own personal beliefs.

A significant part of the problem in science-religion considerations has come to be associated with the fact that those who are not engaged in scientific pursuits still feel driven to look for the causes of things. Tolstoy in his novel *War and Peace* acknowledged this when he wrote:

But the ultimate purpose [of the bee] is not exhausted neither by the one, nor the other, nor the third purpose that human reason is able to discover. The higher human reason

rises in the discovery of these purposes, the more obvious for it is the inaccessibility of the final purpose.³⁰

This idea about purpose has resulted in confusion between purpose and cause and has led to the persistent drive to ascribe causality to God.

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.³¹

This argument of Aquinas has become a hallmark for the Western Church in defining 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-based in reasoning and understanding. Using this approach, God could be placed as the Primary Cause of all things, with science examining secondary causes. This, however, may lead to erroneous conclusions. For example, if all around us are “effects” and God is the only “cause,” then deterministic responsibility for everything lies with God—he is ultimately responsible (and perhaps blameworthy) for all that occurs in the universe, while our ability to cause any changes in or around us fades into insignificance. As the “first cause,” God becomes gradually more distant rather than immediate. Fr Sergius Bulgakov takes this perspective to task, arguing that “The One Who Causes” is not a proper designation for God.³² He bases this on how we understand the word cause. When humans cause things to happen, we think about “cause-effect” relationships; for example, turning the key in the car ignition causes

30 Leo Tolstoy, *War and Peace*, tr. Richard Pevear & Larissa Volokhonsky (Vintage Classics, 2008), 1362.

31 Thomas Aquinas, “Reasons in Proof of the Existence of God, *Summa Theologica* Articles II and II,” *The Library of Original Sources*, vol. V: The Early Medieval World, ed. Oliver J. Thatcher (Milwaukee: University Research Extension Co., 1907), 359–63.

32 Sergius Bulgakov, *The Bride of the Lamb*, 35, 220–22.

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 that this is not the same as "The One Who Causes." If human creativity is somehow a micro-relation to God's creativity and God's creative activity, then we can better understand God as Creator through considering creative acts of humans rather than considering causative facts. A comparison of cause-effect actions with creative actions actually shows that these are 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 multi-dimensional 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. So, a person can easily say "I will make a ___" 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 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-effect are very different things. Bulgakov provides a critique on 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 creature contains the living image of the Creator; and he argues that the world does not have a cause since it was created, and 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 stand from our own creative experiences—things we caused to be made are much less important to us than those we created drawing upon our inspiration, our originality. Such things we are proud of and want to be measured by—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. ..."³³

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, the icon 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 who have attempted to address questions of the interaction of God and the world taking into consideration modern scientific thinking about evolution. There are a few others who have addressed the issue of the interface of science and religion in contemporary Orthodox thought.³⁴ They too have used a theological approach in addressing

33 Sergius Bulgakov, *The Bride of the Lamb*, 221–22.

34 John D Zizioulas, "Preserving God's Creation: Three Lectures on Theology and Ecology," *King's Theological Review* 12 (1989): 11–15; 41–45; 13 (1990): 11–15;

questions of environment, anthropology, creation, and others; 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 specifically examined the theory of evolution and its implications for Orthodoxy.

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 cannot be understood as separated from Creation. God never began being Creator because God was Creator eternally. God's interaction with the world is predominantly creative, not mechanical. Creation is an on-going process that has not ended and will not end. This Bulgakov sees 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, i.e., after the fullness of already existing creaturely life has been implanted. Time exists for the humanity which by nature has consciousness and knowledge of time. The world was not created in time—the time was created in the world, but this creation was supra-temporal, not extra-temporal. Bulgakov states:

Philip Sherrard, *Human Image: World Image. The Death and Resurrection of Sacred Cosmology* (Ipswich, UK: Golgonozza Press, 1992); Dumitru Staniloae, *The Experience of God*, tr. Ioan Ionita & Robert Barringer (Brookline, MA: Holy Cross Orthodox Press, 1994), 102; V. Vukanovic, *Science and Faith* (Minneapolis, MN: Light and Life Publishing Co., 1995); Gayle E. Woloschak, *Beauty and Unity in Creation: The Evolution of Life* (Minneapolis, MN: Light and Life Publishing Co., 1996); David B. Hart, *The Beauty of the Infinite : The Aesthetics of Christian Truth* (Grand Rapids, MI: Wm. B. Eerdmans Press, 2003); David B. Hart, *The Doors of the Sea: Where Was God in the Tsunami?* (Grand Rapids, MI: Wm. B. Eerdmans Press, 2005); Alexei V. Nesteruk, *Light from the East: Theology, Science and the Eastern Orthodox Tradition* (Minneapolis, MN: Fortress Press, 2003).

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.³⁵

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 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 upon in detail as the contrast between the language of empirical history and meta-historical 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 of God's garden. So, just as God is always a Creator, the extratemporal creation which 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

35 Sergius Bulgakov, *The Bride of the Lamb*, 44.

an evolutionary achievement, but an express and new divine creative act that is outside the evolutionary process. It is something new in creation.³⁶

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 human-like creatures, nor is it supposed to.

Concluding Thoughts

Evolution is a law of the living world, as essential for creation as are other laws of nature, and as essential for life as the liturgy is for the Church. Therefore, denying evolution is impoverishing the understanding of creation, which is one of the few expressions of God that humans are all able to perceive while still on this earth. Our bodies are a part of creation, intermingled with all other matter and life. Our passion for the immaterial and striving for the edenic state are expressions of our spirit and essential ingredient of our being “made in the image and likeness of God.” That part of our being need not be explained by biological evolution, nor could it be. At the same time, that spirit gives humans responsibility to be stewards of creation, because they are a co-image of God. God is Creator and Origin, not a simple cause of creation. Knowing how much humans care for products of our own originality, being aware that we and the cosmos are all created together should fill us with awe and a wish to protect and serve the world and each other in order to give to God what is his own. Understanding and accepting biological evolution is of the essence if we are to do this labor of love—making our stewardship right.

36 Sergius Bulgakov, *The Bride of the Lamb*, 174.