

# COSMOLOGY, COSMIC EVOLUTION, AND SACRAMENTAL REALITY: A CHRISTIAN CONTRIBUTION

by *Rudolf B. Brun*

*Abstract.* From the Christian perspective, creation exists through the Word of God. The Word of God does not create God again but brings forth the absolute “otherness” of God: creation. The nature of God is to exist. God *is* existence as unity in the diversity of God the Father, the Son, and the Holy Spirit. The gift of created existence reflects the triune nature of the Word of God. It is synthesis of diversity into unity that creates. Nature brings forth new existence by unifying what it already brought forth previously. Therefore, the creative process of nature is self-similar and nonlinear: self-similar because at all levels it is synthesis that brings forth novelty; nonlinear because the properties of the new unities are not present in their (isolated) elements. The new properties of the wholes, however, do not destroy the properties of the parts. Rather, the elements integrated into new wholes become creatively transformed. This is because the parts become carriers of the whole, which transforms the parts through its presence. The parts become and express the qualities of the whole, qualities that the parts do not possess in isolation. Synthesis, therefore, transforms the parts creatively, because synthesis is creative. The qualities of the parts become “elevated” because the whole becomes present in and through the parts. The understanding of creation as the result of sequential, creative transformations offers a glance into the mystery of the Word of God present in the Eucharist. Here, too, the elements of bread and wine are not destroyed but elevated, creatively transformed into the Word of God. The elements (bread and wine) become the carrier of a transcendent “quality,” the Word of God. From this perspective, creation and the sacrament of the Eucharist illuminate each other. This is because the Word of God that creates the otherness of creation and the Word of God present in the Eucharist is the same.

*Keywords:* Christian doctrine of creation; emergent evolution; Eucharist; sacramental reality of creation.

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Rudolf B. Brun is Professor of Developmental Biology at Texas Christian University, Box 298930, Fort Worth, TX 76129; e-mail [r.brun@tcu.edu](mailto:r.brun@tcu.edu).

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## GOD AND NATURE

Within the Judeo-Christian context there are fundamental, revealed insights that cannot be ignored. The biblical revelation of the relationship that exists between God and creation, for example, is unambiguous: creation is dependent on God, but God is not dependent on creation. This understanding of how God relates to creation excludes any dependency of God on creation: God *is* absolute, independent existence.<sup>1</sup> The biblical revelation of how God relates to creation can therefore not follow a pantheistic or a panentheistic path. It is fundamental for this view that the way God “is” and the way creation is are totally different. One aspect of this absolute difference is that God is eternal, whereas creation is in time.

This is not to say that there is no relationship between God and creation. Christian revelation about this relationship makes it clear only that God is not in any way dependent upon creation. God creates creation not out of necessity but out of nothing, in absolute freedom, out of love. How the loving eternal God relates to time is a central theme for Christian thought. Augustine, for example, writes the following about this relationship between eternity and time:

It is not with God as it is with us. He does not look ahead to the future, look directly at the present, look back to the past. He sees in some manner, utterly remote from anything we experience or could imagine. He does not see things by turning his attention from one thing to another. He sees all without any kind of change. Things which happen under the condition of time are in the future, not yet in being, or in the present, already existing, or in the past, no longer being. But God comprehends all these in a stable and eternal present. . . . His knowledge is not like ours, which has three tenses: present, past and future. God’s knowledge has no change or variation. (Augustine 1972, 452)

And in his work *Confessions* he writes: “Just as you knew heaven and earth in the beginning without that bringing any variation into your knowing, so you made heaven and earth in the beginning without that meaning a tension between past and future in your activity” (Augustine 1991, 245).

Thomas Aquinas also wrestled with the issue of the relationship between eternity and time. Although he and Augustine differ in details, both come to the same fundamental conclusion, namely, there cannot be time “before” creation. Time is a creature and therefore created with creation. God, the primary mover, does not create creation sequentially, step by step in a time. Why? Because movement is in time, yet God is eternal. God does not create sequentially in time but in one eternal, creative act. God creates the world *sine motu, ex nihilo*—without motion, out of nothing (Aquinas 1964, 34–39). All of creation is anchored in that beginning, which is not a moment in time but a beginning that has its roots in the Wisdom of God:

When He established the heavens  
I was there,  
when He marked out the vault  
over the face of the deep;  
When He made firm the skies above,  
When He fixed fast the foundations  
of the earth;  
When He set for the sea its limit,  
so that the waters should not  
transgress His command;  
Then was I beside Him as his craftsman.

—Proverbs 8:27–29 NAB

Over time, Christianity came to understand that this Wisdom, through which creation exists, is the Word of God, the Son of God, Jesus Christ. Saint Paul writes: “He is the first-born of creation, for Him all things were created in heaven and on earth” (Colossians 1:15–16).

The difference between eternity and time is a dimension of the ontological difference between God and creation. God “is” not the way creation is. It is the nature of the immutable God to exist. Yet it is the nature of nature to have a beginning, to become, to exist through the ever-fleeting moments of time, within the oscillation between being and nothingness (Hegel 1969, 83).

For creation, past, present, and future are separated from one another; for the eternal God, they are one. Karl Barth writes:

God’s eternity, like His unity and constancy, is a quality of His freedom. It is the sovereignty and majesty of His love in so far as this has and is pure duration. The being is eternal in whose duration beginning, succession and end are not three but one, not separate as first, a second and a third occasion, but one simultaneous occasion as beginning, middle and end. Eternity is the simultaneity of beginning, middle and end, and to that extent it is pure duration. . . . Time is distinguished from eternity by the fact that in it beginning, middle and end are distinct and even opposed as past, present and future. Eternity is just the duration which is lacking to time, as can be seen clearly at the middle point of time, in the temporal present and in its relationship to the past and the future. Eternity has and is duration which is lacking to time. It has and is simultaneity, temporal present and future. Eternity is just duration. (Barth 1957, 608)

It is therefore not possible to extrapolate from created being that is in time to the “being” of God who is eternal. God “is” essentially duration, existence: God is essentially other. Creation is not *in* God but essentially outside of God. Within God, creation would not exist, because within God there is God, not the world! God neither is immanent in the world nor transcends the world: God is essentially other. The relationship between God and creation is not one of immanence or transcendence but of absolute otherness. This is why pantheism and panentheism cannot claim to

offer orthodox Christian perspectives into the mystery of creation.

The absolute otherness of God and creation has to be kept in mind while pondering the relationship between the Christian God and creation. Why? Because the fundamental dogma of Christianity is that God loves creation. Although the love of God surpasses all human understanding, there is an analogy of love between the love of God and the love between human beings. Through this analogy of love it is possible to see the structure of the relationship between God and creation. As a human being is capable of loving the “otherness” of a beloved person, so does God love creation in ways that surpass all human love. Yet we know by experiencing love that providing the space in which the otherness of the beloved person can become itself is the foundation for any loving relationship. Husband and wife do not live their loving relationship in a model of immanence and transcendence but through the occasionally painful celebration of each other’s otherness. Bringing up children is an exercise of how essential it is to provide the space for otherness to become. Letting be as well as respecting and enjoying otherness are fundamental to any loving relationship. It is within this analogy of love that Christians must reflect upon the relationship between God and creation.

Through the life, death, and resurrection of Jesus Christ, God proves his love for the world. Creation came to be through the Word of God, which emptied itself so that creation could be. John writes: “In the beginning was the Word, and the Word was with God and the Word was God. He was in the beginning with God. All things came to be through Him and without Him nothing came to be” (John 1:1–3 NAB). Paul further develops this insight in his first letter to the Colossians (1:15–17 NAB): “He is the image of the invisible God, the firstborn of all creation. For in Him were created all things, in heaven and on earth, the visible and the invisible, whether thrones or dominions or principalities or powers; all things were created through Him and for Him. In Him everything continues in being.”

Creation, the otherness of God, is created through the Word of God. Creation is not God but created through the Word of God. Hegel understands this to mean that “Nature is the Son of God, not as Son however, but as abiding ‘otherness’” (Hegel [1827] 1970, 206). The philosopher and theologian Vladimir Solovyev unfolds this Hegelian thought in the following way: God is omnipotent. This is to say that God is not limited. There is no other to God that could limit God. This is because God is otherness within Himself. The otherness of God the Father is God the Son, united with the Father in God the Holy Spirit. This is Hegel’s otherness of God within God. The nature of God is Trinitarian (Solovyev [1889] 1948, 157–59).

Why does God create? Because God the Almighty wants to give existence to nothingness. He wants nothingness, the antithesis of God, to

become reality. God wants to give existence to what is outside of God, to give the gift of existence to what is not God. Nothingness has a chance to become something because God's love is so powerful that God is capable of giving his existence away to the otherness outside of God, to nothingness. This insight into the creative act of God has found its expression in the formula *creatio ex nihilo*, creation out of nothing.<sup>2</sup>

This gift of existence to creation is a gift truly given. The Word of God, God the Son, the otherness of the Father within God, leaves God, empties itself into nothingness so that creation may be. The gift is the Word of God truly given to the otherness of creation.<sup>3</sup> The Word of God spoken into creation creates the space for creation to become itself, no strings attached. This gift is given to creation so that it can become itself, not God. It is the gift of God's grace, given to creation through his Word, Jesus Christ, that creates creation: "For God so loved the world that He gave His only Son" (John 3:16 NAB). God gave his Son to creation so that creation could become through the Word and for the Word.

#### HOLY SCRIPTURE AND THE BOOK OF NATURE

From the Christian perspective, the Word revealed in the Bible and the Word that creates nature must be the same, because creation springs forth from the Word of God. The understanding of nature gained by science is therefore of fundamental importance for a Christian doctrine of creation. Especially in a time like ours, in which so much has been learned, the church must be fundamentally interested in the worldview gained by science. Without integrating these insights into its teachings, the church cannot proclaim the Christian message in a credible way today.<sup>4</sup>

What is the most fundamental discovery made by modern science that a Christian theology of nature needs to integrate? In my view it is the discovery that nature is capable of creating itself. There can no longer be any reasonable doubt that the physical universe, life, and human beings are the result of the same natural, creative process. There are so many facts in favor of evolution that it is no longer a hypothesis or a theory. Evolution is the fundamental law of the universe.

A different question is whether science has discovered how evolution works. In my opinion, the answer here is yes and no. Yes, because one can argue on scientific grounds that nature works the same way throughout cosmogenesis. Evolution consistently brings forth the new through the integration of the old: atoms from elementary particles, molecules from atoms, life from integrated molecules. This architecture reflects the creative process by which nature brings forth novelty: at any dimension, from the smallest patterns possible to the superstructure of the entire universe, the new emerges from the integration of what emerged before.<sup>5</sup> New unities emerge through integration of elements that were previously integrated.

This is to say that any new entity consists of previously integrated entities. At any level, wholes consist of elements that are wholes themselves, yet at a lower level. This hierarchical architecture is the consequence of the natural creative process. “Higher” and “lower” are not value judgments but refer to the historicity by which younger (higher) hierarchies are dependent upon older (lower) hierarchies. As long as there is energy left from the original explosion of the Big Bang, the creative process will continue bringing forth new hierarchies by integrating older hierarchies. Even after destructions caused by disasters and catastrophes, the creative process will start anew. It is creation’s nature to continue integrating the pieces left into new wholes that will serve as basic elements for subsequent creative steps. The point is that the universal creative process is self-similar but nonlinear. It is nonlinear because the new has properties that do not exist at the level of the unintegrated parts. The nature of the creative process is to create new levels of realities by constantly repeating the two-step process of diversification and integration. As long as there is energy to drive the process, universal morphogenesis does not—and cannot—stop (see Prigogine 1980; Kauffman 1995).

#### UNIVERSAL EVOLUTION AND THE PROBLEM OF TELEOLOGY

Is the process of evolution oriented towards reaching a predetermined goal? Before trying to answer this question one needs to carefully separate different types of teleological processes. Ernst Mayr does this by distinguishing two types of goal-oriented processes: teleonomic and teleomatic. He writes: “The discovery of the existence of genetic programs has provided a mechanistic explanation of one class of teleological phenomena. A physiological process of a behavior that owes its goal-directedness to the operation of a program can be designated as ‘teleonomic’” (Mayr 1982, 48). Mayr goes on to define teleomatic processes:

Any process, particularly one relating to inanimate objects, in which a definite end is reached strictly as a consequence of physical laws may be designated as “teleomatic.” When a falling rock reaches its endpoint, the ground, no goal-seeking or intentional or programmed behavior is involved, but simply conformance to the law of gravitation. So it is with a river inexorably flowing toward the ocean. When a red-hot piece of iron reaches an end state where its temperature and that of its environment are equal, the reaching of this endpoint is, again, due to strict compliance with physical law, the first law of thermodynamics. *The entire process of cosmic evolution, from the first big-bang to the present time, is strictly due to a sequence of teleomatic processes on which stochastic perturbations are superimposed.* (1982, 49; emphasis added)

I fully agree with distinguishing goal-oriented processes that are guided by programs from those that simply follow physical laws. I disagree, however, that evolution is a sequence of teleomatic processes “on which stochastic perturbations are superimposed.” I disagree because the falling

rock releases energy, while the evolutionary process is dependent upon an intake of energy. The falling rock moves towards homogeneity and equilibrium, while evolution generates heterogeneity and only occurs in structures far from equilibrium (Prigogine 1980, xi–xix). The result of teleomatic processes is predictable: increasing entropy or degeneration; the result of evolution is decreasing entropy and the unpredictable emergence of new patterns.

Teleomatic processes and the process of evolution are essentially different. Cosmogensis is not a teleomatic process but a process that will generate new patterns. The organization of these patterns, however, is unpredictable, because they are the result of what actually happened as opposed to what could also have happened. Evolutionary patterns are essentially probabilistic, historical events with numerous degrees of freedom. One can predict that patterns will form, but how history will shape them is impossible to forecast. I suggest referring to evolutionary pattern formation as teleomorphic processes with the following definition: *Teleomorphic processes are oriented toward the generation of increasingly complex patterns the organization of which cannot be predicted.* The notion of teleomorphic processes integrates the necessity of emergence with the probabilistic nature of history. Teleomorphic processes, therefore, integrate the predictability that increasingly complex patterns will be generated with the unpredictability of the precise sequence of the historical events that will bring such patterns into reality. Teleomorphic processes combine the predictability of the emergence of increasingly complex patterns with the unpredictability of any essentially probabilistic sequence. Knowing all the parameters of the present does not allow prediction of the future, as S. P. Laplace claimed. The new is not already determined in the past; it emerges as genuine, unpredictable novelty.

In my opinion, this summarizes fairly the understanding of evolution by physics and chemistry. Biologists might object because, according to the neo-Darwinistic understanding of evolution, mutation and natural selection is the two-step mechanism that brings forth organismic evolution. I fully agree that natural selection provides the directionality in organismic evolution. However, natural selection can work only on organisms (phenotype), not on their genome (genotype). The fundamental driving force in organismic evolution is toward complexification of genetic programs. Natural selection, through the principle of competition, sorts out what organismic novelty will survive (see n. 8). We start to understand at least some of the mechanisms that led to increasingly complex genotypes. In his book *The Shape of Life*, Rudolf Raff writes: “Evolutionary changes are facilitated by the duplication of genes, including control genes. The duplicated genes are similar to, but distinct from, the ancestral genes, and can be co-opted to carry out related but different functions” (1996, 203).



Genes that interact with one another to generate genetic programs can also duplicate. At first, such duplicated programs might simply be redundant, but in a second step they might become different through mutations. Additional mutations might link a newly generated program with the original one. Such an event might provide the genetic burst necessary for the appearance of significant, phylogenetic novelty. Obviously it might take considerable time for a quantal, evolutionary event to appear in the fossil record. A critical parameter is how fast the new organisms proliferated and spread into environments favorable for their fossilization. This understanding might help explain why evolution is quite frequently punctuated—not gradual.<sup>6</sup>

In my view, it is this process of genomic complexification that brings about increasingly complex forms of life. Modern molecular genetics is on the verge of concluding that the driving force of biological evolution is the generation of new genetic programs that control embryonic development. These genetic programs become increasingly complex through duplications of already existing programs, their diversification by mutations, and their integration into new genomes. The process is generating increasing complexity through the pattern of duplication, diversification, and integration. If this is the case, and I think it is, the evolution of organisms would follow the pattern through which complexification is also achieved in physical evolution already at the level of atomic evolution. Complexification in physical as well as in biological evolution would follow the same pattern.

This understanding of the evolutionary process suggests that there is an inherent drive toward complexity (not progress!) in nature,<sup>7</sup> a drive to increase complexity by integrating elements into new wholes. The creative process is, however, not teleological but teleomorphic. This is true for the evolution of atoms and molecules as well as for the evolution of life. The important point here is that there is no break in the creative process between physical and organismic evolution.

There are lower and higher levels of reality in nature because the creative process integrates elements at one level to construct the next. The reality of each level is dependent upon the structural support of the elements it integrates. Because of the self-similarity of the evolutionary process, unities (or wholes) are hierarchically organized. Integrated parts reach into a level of reality that is not accessible to them in isolation. United, however, the parts are transformed, because they become the carriers of a unity that they bring forth through integration. This is similar to a pyramid in that the top reaches into heights that the building blocks cannot reach in isolation. By being integrated into the superstructure of the pyramid, the building blocks participate in the height reached by the top.

Each new level, therefore, emerges through unification of previously integrated unities. The highest level of reality that nature has brought



forth is human self-consciousness. It emerges from the integration of the conscious and subconscious elements of the human psyche. These emerge from the physiological interactions of the different parts of the human brain. The human mind, conscious of itself in the lucidity of the "I," is the top of a psychic hierarchy that integrates hierarchies of already integrated hierarchies.

This, however, is not the structure of only the human mind. The human body is similarly constructed. It consists of integrated organs made of integrated tissues that integrate a diversity of cell types. Each cell is in itself a hierarchy of integrated hierarchies, from its organelles down to chromosomes, DNA, nucleotides, molecules, and atoms. As one disassembles each hierarchy into its parts that are themselves hierarchies, one travels the route of evolution back in time. Cells are younger than the parts they integrate; chromosomes are younger than their genes; these are in turn younger than their molecules, and those are even younger than the atoms from which the molecules were synthesized. Because the universal creative process is self-similar, any entity is a unity of elements that are unities of elements themselves. This is why disintegrating a unity into its elements leads to the discovery that the elements so isolated are integrated unities themselves. This is the imprint left by the self-similarity of the evolutionary process. New complexity emerges from the synthesis of elements that are themselves complex.

The discovery of this fundamental architecture of physical as well as biological evolution provides an essential insight: There is no gap between physical and biological evolution.<sup>8</sup> The natural process of general evolution works in the same way at any level. The process does not destroy the previously created elements. It does not melt the elements into some uniform amalgam that is then cast into new forms. Rather, the maintenance of the peculiarity of the elements is a precondition for the synthesis of novelty. There are no tissues without different cell types, no organs without various tissues, and no bodies without a diversity of organs.

This hierarchical structure is the consequence of the self-similarity of the natural, creative process of evolution (Brun 1994). The process is creative in that it integrates new hierarchies from hierarchies that, by definition, are integrated entities themselves. The evolutionary process therefore is not a random walk but is oriented toward increasing complexity. However, the direction of cosmic evolution toward the generation of hierarchies of integrated hierarchies does not preclude genuine history. The history of the universe is thus neither predetermined (teleological) nor random. Evolutionary history integrates the necessity to form patterns with the chance of their historical outcome. The unpredictability is a result of the historical nature of creative events. The probabilistic nature of evolution precludes determinism but includes the chance to increase complexity. Evolution is a creative process that integrates what seems to be mutually

exclusive, namely, increasing complexity with undetermined outcome. The nature of the evolutionary process is not teleomatic but teleomorphic.

Throughout cosmogenesis, the creative process is consistently the same. This discovery has profound implications for a philosophy of nature. Does science understand the creativity of nature? Here, I think the answer is a definite no. This is because the methodology of science lends itself to uncovering mechanisms of *how* synthesis brings forth the new. *Why* it is that synthesis creates novelty is not a question in the domain of science. Rather, the question relates to the realm of a metaphysic that is anchored in science but transcends science. The philosopher Karl Popper described this ontological structure of nature precisely: “We live in a universe of emergent novelty” (Popper 1974, 281).

Such insights are also of fundamental importance for an updated Christian theology of nature, because the way nature is creative leads to a deepened understanding of the relationship between nature and human beings. It makes the kinship between human beings and creation explicit. Humans are not placed into this world from the outside but have emerged through the natural creative process from within creation. We are reminded of this fundamental truth by Philip Hefner: “We are, first of all, thoroughly natural creatures. We have emerged from the natural evolutionary processes. These processes have bequeathed to us a constitution that is informed by both genetic and cultural material” (Hefner 1993, 19).

Science brought this blood relationship between human beings and creation into the foreground. For an updated Christian doctrine of creation, the position of human beings in creation needs to be carefully reassessed. Science showed that in spite of human beings living on Earth, Earth is not the center of the universe, and human beings are not the goal of evolution. Science put us into “nowhere” as our place. Why? To better understand the real centrality of our place, which is the kinship between creation and human beings. From the Christian perspective this place is to faithfully continue the journey of faith: “For creation awaits with eager expectation the revelation of the children of God” (Romans 8:19 NAB).

#### UNIVERSAL EVOLUTION AND GOD’S PLAN OF SALVATION

An essential component of the Christian message is that God has a plan for creation: to save it. According to science, cosmogenesis is nothing more than evolutionary history brought about by natural law, not by supernatural guidance. If so, how can God realize his plan to save creation? Does not the Christian faith demand that science demonstrate a plan that guides cosmogenesis toward a predetermined goal? After all, should science not be a servant of theology, supporting theology in its quest for a better understanding of supernatural, eternal truth? Rather than science helping out, however, by demonstrating that nature follows a plan—bringing forth

human beings, for example—most scientists cannot find any evidence for such a plot.<sup>9</sup> In my view, the hope of some theologians that one day scientists will discover the Christian history of salvation to be the guiding principle of evolution is a fallacious expectation. The fallacy is reducing dimensions of faith to the dimensions of reality accessible to science. There is no map drawn by science that can guide theologians through the land of faith. Why? Because the history of salvation does not run parallel with the history of creation. The time of faith is not identical to the time of worldly history, because salvation is ever present rather than occurring after history comes to an end. According to the Christian view, the kingdom of God will not come sometime in the future; it is always already present, has always already arrived.<sup>10</sup>

For Christians some basic questions are: How can God implement his plan to save creation if creation is capable of creating itself? How can God assure the creation of human beings through the natural process if he does not intervene, at least during critical phases in evolution? The critical answer from within Christian theology to both of these questions is that God does not create sequentially in time but *sine motu* (without motion: see the argument by Augustine and Thomas Aquinas cited earlier). Supernatural interventions at critical moments must also be firmly rejected on scientific grounds. After Darwin showed that the interaction between variation and natural selection is sufficient to drive evolution, special creation of human beings could no longer be a reasonable explanation for any phase in organismic evolution (for a detailed rejection of the argument from design, see McMullin 1993). I cannot agree with any interventions of the Creator into the process of cosmogenesis, not for the origin of human beings, the emergence of life, or even during a few milliseconds at the beginning of the universe, because such supernatural interventions would jeopardize freedom. If God intervened in the creative process, God would also be responsible for *not* intervening—for accidents, catastrophes, indeed any conceivable evil. If there is manipulation by the Creator at any time during the process of cosmogenesis, then God is to blame for how creation has turned out.

In order for the Christian message to make sense, creation needs to be capable of creating itself. This is essential for the loving relationship between God and creation. Creation has to be free to enter into this relationship of love with God. From an orthodox Christian perspective, God's plan of salvation is executed not by his fine-tuning the Big Bang or intervening to bring forth life or human beings but through the death and resurrection of Jesus.

The question of how it is possible that creation can freely create itself while precisely fulfilling God's plan to save it has to be pondered by keeping in mind the relationship between eternity and time. God is eternal, and so is his saving plan for creation. God does not come up with a plan

for creation today and change it tomorrow, for God is eternal, not in time. Eternity and time are essentially different, yet they are united in this difference. The eternal plan of God for creation is precisely executed without negating the genuine history of creation. It is a paradox that eternity and time are united through their difference, not isolated from one another. This paradox cannot be dissolved. It needs to be left standing because it offers a glimpse of what it means to say that God is almighty. The trinitarian structure of God “being” One in the diversity of three persons is shining through. All of creation—all that exists, including eternity and time—mirrors unity in diversity, the trinitarian nature of God.

In this view, unity in diversity is the fundamental structure of the relationship between God and creation. At the center of this relationship is the analogy of love, the mutual affirmation and enjoyment of otherness. The love of God for creation is beyond all understanding; our human experience of love, however, allows a glimpse into the central importance of otherness. Without the affirmation and enjoyment of this fundamental structure there cannot be a loving relationship. Otherness also implies each partner giving the space and freedom to the other for future growth in the loving relationship. Also implicit in the affirmation and enjoyment of otherness is the acceptance of the history through which the beloved partner became what he or she has become.

For our understanding, time and eternity exclude one another. Our reason, however, tells us clearly that eternity cannot be limited by time. We understand that eternity and time are essentially different from one another, yet reason sees that they are united in this difference.

What does this mean for the problem of how God’s plan of salvation relates to cosmic history? It means that cosmic history is not under the tutelage of eternity. Cosmic history can become itself in its domain that consists of past, present, and future. Yet, because eternity and time are united through their difference, the eternal plan of God to save creation is real any moment in time. The paradox consists in that creation is free to create itself through its own history, and through this history the eternal, saving plan of God becomes precisely executed. The paradox is rooted in the essence of love that respects the freedom of the beloved other. How this is possible can be experienced in any loving relationship but is essentially beyond human understanding. There is, however, a historical example that illustrates this paradoxical relationship between eternity and time. It is the passion of Jesus Christ, in which the human beings involved were acting freely, executing their own plans, yet by their doing so the eternal plan of God was precisely executed. I cannot think of a human author capable of writing a play in such a way, an author who lets the actors act whatever they feel is best for them and by doing so precisely execute the play the playwright has envisioned. To my mind, the story of Jesus’ life, passion, and resurrection is the most powerful demonstration of

the paradox that exists between eternity and time. This paradox of how it is possible that eternity and time are essentially different from one another yet united in this difference is at the heart of the problem. The problem is how the eternal saving plan of God can become reality within the history of time. There is no solution for human understanding, only the paradoxical insight offered by the example of the story of Jesus Christ.

From the view offered through this story one might see an analogy of how creation can create itself yet precisely fulfill God's plan of salvation. There is, however, no possibility to dissolve this paradox into a solution that can then be analyzed by science. Just as there is no saving plan that can be detected by historical research into the life and death of Jesus Christ, so the history of creation told by science cannot document any plan of a creator. In both cases, the insight that God has a saving plan for creation is given by faith, not by human or natural history.

The fundamental message of Christianity is that God loves his creation. Based on the analogy of love that exists between the love of God and the love of human beings, it becomes obvious, on theological grounds, that creation *has* to create itself. How could it be true that creation is called to be the loving partner of God if creation cannot become itself? How could creation genuinely enter into the loving relationship offered by the Creator if creation cannot refuse it? The freedom of creation to make this choice is fundamental to the Christian message. For without freedom of God *and* creation, the Christian message does not make sense. The discovery made by science that creation is indeed capable of creating itself confirms what is implicit in the fundamental Christian dogma, namely, that God loves creation. It is from this fundamental dogma that any version of supernatural intervention, and teleology, including all forms of the anthropic principle, must be rejected.<sup>11</sup>

#### GOD AND CREATION: FAITH SEEKING UNDERSTANDING

If the Word of God creates creation, and Christian theology holds that it does, then the creative principle that does the creating has to always be the same, because the Word of God is eternal—it does not change through time. In my view, science has uncovered this consistency of the natural, creative principle: universal evolution is the result of sequential syntheses. It is the integration of the old that brings forth the new; synthesis is creative. The teleomorphic process that brings forth the entire universe is always the same. This is the first contribution made by science that is essential to a deepened understanding of the Christian faith.

The second contribution that science makes to “faith seeking understanding” is that synthesis never destroys. The elements that synthesis integrates into new wholes do not lose their identity. Rather, they gain a new reality, which creatively transforms them. The elements of a whole

gain a new reality because the whole becomes reality through the parts. The elements are *creatively* transformed because the integration of the parts creates a new unity in which the parts participate. This participation of the parts in the whole transforms the parts. They become the carrier of a unity in which by themselves, in isolation, they do not participate. This elevation of the elements into the reality of the whole, their creative transformation, is the hallmark of the entire creative process of cosmogenesis.

A third contribution made by science to a better understanding of the Christian faith is ontological in nature. Evolution works by integrating diversity into unity. New existence springs forth from the integration of diversity. The fundamental, ontological structure of all that is demonstrates this fundamental paradox of unity through difference (Heidegger 1960). I see this structure of being as a glimpse of the Word of God in the otherness of nature. God “is” existence as unified diversity of the three divine persons. That anything that is in creation exists as difference in identity mirrors the trinitarian structure of the nature of God. This nature of God is to “exist” as unity in the diversity of the Father, the Son, and the Holy Spirit. In this view, unified difference brings forth new existence because this ontological structure is the imprint in creation of the trinitarian nature of God’s Word.

From the Christian perspective, creation is brought forth by the Word of God that departs from God into the otherness of creation. Through this incarnation into the otherness of creation, the Word of God brings forth creation in time, through sequential, creative transformations. What already exists is unified to create the new; parts are integrated to form new wholes. This elevation of the parts into the reality of the whole is the working of the Word of God through its dimension of grace. Grace accepts what already exists and, without destroying these elements, elevates them into a new reality. The incarnated Word of God creatively transforms nothingness into creation step by step, letting creation become itself.

From this perspective on creation one might gain an insight into the sacrament of the Eucharist. Here, too, the elements of bread and wine are not destroyed but are being creatively transformed. In creation, as in the Eucharist, the Word of God creates not by destroying or replacing what is already there, what already exists, but by elevating the old into the new. For Christians, the celebration of the Eucharist is the culmination of Christian life and worship. In consecration, bread and wine become the body and blood of Jesus Christ. They become a new reality through ontological change (Pope Paul VI [1965] 1981, 172). For Christians, therefore, bread and wine are not just symbols of Christ but *are* Christ. In Thomistic metaphysics, transubstantiation precisely expresses this fundamental belief. It fails, however, to explain why the “accidents” or “species” of bread and wine remain even though the “substances” of bread and wine have become other substances, namely, the body and blood of Christ.

In contrast to the static concept of “eternal substances” in Thomistic metaphysics, we know today that creation is essentially dynamic. Synthesis creates novelty by integrating elements into a higher unity without destroying the peculiarities of the integrated elements. Synthesis creatively transforms the integrated parts into a new whole. This new whole is present in the parts through their particular modes. Integrated parts, therefore, express a reality that in isolation they cannot. Because the whole is real through the integrated parts, the parts become the whole through their peculiarity as elements.

This is not (yet) Eucharistic theology but an updated philosophy of nature. It attempts to integrate the most fundamental insights into the nature of the universe obtained by modern science. Eucharistic theology will have to integrate this essentially new understanding of nature, because the Word of God in creation and present in the Eucharist is the same. This view suggests that creative transformation is the principle of creation and the Eucharist. The notion of creative transformation is quite close to the old explanation of the Eucharistic mystery by transubstantiation as consubstantiation.<sup>12</sup> Yet the concept of creative transformation might provide a better insight into the mystery of the sacrament. The substance of the body and blood of Christ and the substances of bread and wine are not on the same level of reality but form a hierarchy. In this new hierarchy bread and wine are creatively transformed into the body and blood of Jesus Christ. Through consecration, bread and wine become integrated into this new reality in such a way that they become this reality without being destroyed. Through this interaction the elements of bread and wine are not replaced but elevated by the real presence of the Lord. Creative transformation, the principle through which the Word of God creates the new from the old, is the same in the Eucharist and creation.

Creative transformation does not replace or dispose of what has been previously created. Rather, throughout cosmogenesis, as well as in the Eucharist, the old is elevated into the new by the nature of God’s grace. The sacrament of the Eucharist is, therefore, not “out of this world.” It sheds light on the sacramental character of creation. The mystery of the Eucharist as well as the mystery of creation are impenetrable; they illuminate one another.

Creation is essentially revelation of God because creation is his Word spoken *into* creation. Creation, therefore, is essentially self-manifestation of God in the otherness of creation. At the center of creation is the gift of God of himself—so that creation can become. This gift from God the Father, namely his Son, the Word of God, is the gift to creation. It is this gift that enables creation to create itself, namely, the otherness of God. The Word of God departs from God into nothingness, so that otherness of God, creation, can become. Creation is therefore not out of God but out of nothing. Yet through this gift of the Word of God to creation, creation



participates in the nature of God through its essential otherness. How God and otherness of God can be one is visible in the Word of God incarnate, Jesus Christ. In him and for him is everything that is. "He is the firstborn of creation, for in him all things were created in heaven and on earth" (Colossians 1:15–16 NAB).

Creation is the first and fundamental sacrament, because creation participates in the nature of God through this essential otherness. Langdon Gilkey expresses the heart of the matter when he writes, "To know God truly is to know God's presence also in power, the life, the order, and the redemptive unity of nature. Correspondingly, to know nature truly is to know its mystery, its depth, and its ultimate value—it is to know nature as an image of the sacred, a visible sign of an invisible grace" (Gilkey 1993, 204). For Christians this becomes visible reality in the birth of Christ. In Christ, the Word of God, who is God, and the Word of God in the otherness of creation are demonstrably one. In Christ, creation and God are united *in the difference*—not flat sameness. Through the unification of creation with God in Christ, creation participates in the nature of God. It is this unification of God and creation that makes creation sacred.

The mystery of creation as well as the sacrament of the Eucharist are incomprehensible because both have their origin in the Word of God.

#### NOTES

1. For a summary of different views and models of how God might relate to creation, see Peters 1996.

2. For a history of what led to this insight, see Gerhard May's *Creatio Ex Nihilo* ([1978] 1994).

3. Jürgen Moltmann (1985) pursues a similar appreciation.

4. I am quite sure that I'm not alone in appreciating the interest that the current pope has in these important matters. See for example: John Paul II 1990. For the necessity to rethink the Christian faith to make it reasonable again to believe in our time, see Hall 1996.

5. The magazine *Nature* carried an article (Pascarella et al. 1996) that described how galaxies might have formed through the merger of subgalactic clumps (but also see Scodreggio 2001).

6. This view is based on Stuart Kauffman's contributions on the functioning of genetic networks, on one hand (Kauffman 1993, 407), and on the model of punctuated equilibria proposed by Niles Eldredge and Stephen Jay Gould (1972) on the other.

7. Already G. W. Leibniz and J. B. Lamarck suggested such a drive in nature. I think they were both right. The problem, however, was that Lamarck equated complexity and progress. The notion of progress depends on value judgments, complexity does not. The level of complexity could perhaps be quantified by determining how many hierarchies the hierarchy of interest integrates.

8. Among biologists the notion that organismic evolution is essentially different from physical evolution is still widespread. Biologists argue that evolution works through the two-step process of mutations and natural selection. Because there is no individual variation between atoms or molecules of the same kind, natural selection cannot select. Therefore, some biologists argue, one should not use the concept of evolution for the "so-called evolution in different areas" (Mayr 1982, 627). From my perspective, biologists who argue in this way miss an important point. It is that organismic evolution, at least at the level of phyletic evolution, depends on complexification of the genome. We start to understand some of the mechanisms that bring forth increasing genomic complexity. Natural selection works post-factum on the new phenotype brought forth by genomic complexification. The point is that complexification is at the base of both, physical as well as organismic evolution.

9. In recent years some physicists have advocated that there is a principle at work in nature to bring forth human beings (see Barrow and Tipler 1988). There are different understandings and definitions of this anthropic principle. Errol E. Harris thinks that such a principle is philosophically justified. See Harris 1991; Russell, Murphy, and Isham 1993.

10. I'm greatly indebted to Pierre Teilhard de Chardin's work. I do not believe, however, that the history of evolution, including human history, is oriented toward a predetermined goal ( $\Omega$ ), because such determinism would preclude human freedom. Without freedom, there could be no loving relationship between God and creation.

11. I therefore have to disagree with Joseph M. Życiński (1996) that the weak anthropic principle gives credence to an argument from design.

12. For a discussion of the term *consubstantiation* and its origin, see Plotnik 1970, 32–33.

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