

# ***Dancing with the Sacred—Dialogue with Karl Peters***

*DANCING WITH THE SACRED: EXCERPTS*

by *Karl E. Peters*

*Abstract.* In excerpts from my *Dancing with the Sacred* (2002), I use ideas from modern science, our world's religions, and my own experience to highlight three themes of the book. First, working within the framework of a scientific worldview, I develop a concept of the sacred (or God) as the creative activity of nature, human history, and individual life. Second, I offer a relational understanding of human nature that I call our social-ecological selves and suggest some general considerations about what it means to live meaningfully and morally in an evolutionary world. Third, I explore how we might be at home in a universe that is constantly changing and in which suffering and death are interwoven with life and new creation.

*Keywords:* change; creativity; ecological; evolution; God; meaning; morality; sacred; science; self; suffering.

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During my career as a teacher of philosophy and religious studies and a scholar in religion and science, I have been developing a way of understanding the presence of God in my life that is compatible with the ideas of modern science. This is not because I think science has all the answers but because the traditional understanding of God that I grew up with did not help me experience the presence of the sacred in my own life. Traditional

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approaches offer much insight into the sacred, but by themselves they have not provided a practical theology that has been sufficient for my own living.

Seeking a practical theology has led me to engage in a thought experiment. I have come to think of God as the creative process or creative event rather than a being who creates the world. Essentially, this new way of thinking regards everything as events or processes rather than as beings or substances. It is not so much a shift in religious thinking as in philosophical thinking regarding the general categories we use to conceptualize all existence. It is called process thinking.

Many religious thinkers today are process theologians. Most of them use personal metaphors and models in portraying God. My own approach has been to explore nonpersonal metaphors and models. Others who have used this approach call what I'm doing "naturalistic theism." As a naturalistic theist I do not deny that God is more than the world, but I do want to focus continually on how we can know and be related to God in our natural world. This to me is crucial for religious living.

The nonpersonal model of God I describe in this book is based on the Darwinian idea of random variation and natural selection. Suggesting that God is a process with two aspects, I philosophically generalize this model to all levels of existence—cosmic evolution, biological evolution, cultural evolution, and developments in our own lives. One aspect of this two-part process is the emergence of new possibilities in nature, human history, and personal living. The other is the selection of some of these possibilities to continue. With this model I suggest that God—conceived of as the creative process—is like a dance. By participating in the creative process we are dancing with the sacred.

Dancing with the sacred, or living daily with the living God, is important for me in finding meaning and purpose in life. It also is important for living harmoniously with the rest of life on our ever-changing planet. As a result of the rise of Western democracies, free-market economies, and modern science and technology in the last few centuries, many of us have come to enjoy increased material prosperity. At the same time we are beginning to recognize that our modern life-style is harming other creatures, diminishing the functioning of ecosystems, and altering our global climate patterns. We worry that what we are doing to our planet will adversely affect the lives of our children and grandchildren. So the question arises: how can we relate to the sacred creative process in ways that will motivate us to live for the good of our entire planet and not just for ourselves?

While I think of God as a sacred dance that continuously gives rise to new possibilities for existence and selects some of those to continue, I realize that loss and suffering are also a result of this process. People get sick and die. Species evolve to extinction. Occasionally natural catastrophes alter the functioning of planet Earth, bringing about mass extinctions. What might it mean to live with hope and to work toward the greater well-being of ourselves and the planet in the midst of suffering, loss, and perishing?

This book is an exploration of these issues. I use some ideas from modern science, the world's religions, and my own experience with family and friends to suggest how it is possible to be religious in evolutionary terms. First, I try to see how the sacred can be understood as the creative activity of nature, human history, and individual life. Second, I explore how we might understand ourselves in a way that motivates us to live more in harmony with the rest of life on planet Earth. Third, I try to see how we might live meaningfully in a world in which suffering and death are creatively intertwined with life.

This is a thought experiment. Many people experience the sacred in their lives from the perspective of traditional personal understandings of God. Many are addressing environmental issues inspired by their own religious traditions. And many use traditional ways of understanding the sacred and our world in coping with the tragedies of existence in their lives and on our planet. I appreciate all these resources for living. As a teacher in courses on the world's religions, science and religion, and environmental ethics, I have explored many traditional ways of thinking with my students. I find much wisdom in religious traditions.

However, I also find that my mind has been shaped by the world view of modern science. I live with a scientific understanding of things in my daily life, and I use the fruits of the natural and social sciences to clean my house, gain knowledge of what is happening in other parts of the world, treat my illnesses, understand the workings of my brain, and find insight into my personal relationships with others. For me it is only one more step to ask how scientific knowledge might help me in my religious living. Some of what I've learned I share with you in this book—as an experiment in a new way of the meaning of life.

#### SCIENCE AND SOCIETIES IN THE EMERGING GLOBAL VILLAGE

The term “global village” is often used to describe a phenomenon of which many are becoming more conscious. Recently I purchased a new German car, an American brand television set made in Taiwan, and an Italian-named microwave built in Korea. Coca-Cola now sells in the People's Republic of China, and McDonald's sells hamburgers in Russia with beef from Brazil. The transportation and communication technologies of the last half of the twentieth century are making physical and mental travel more common. An airline flying from Chicago to San Francisco has an emergency instruction book printed in seven languages. We can circle the globe on the World Wide Web while staying at home. In so many ways we are economically and consciously becoming a global village.

The phrase global village conveys the idea that we are so interconnected with each other that it is as if we are living in a village. In villages people know everybody's business. While we don't literally know everybody's business in our world, we know more than ever before about the lives of other

people as they are filtered through the media. Political reforms and revolutions, famines, international sports events, ecological disasters, explorations in space, swings in the stock market, peace initiatives, military build-ups—events that signify both the best and worst for humanity and the earth are shared daily via the media on a planet-wide basis. The amazing thing is not that everybody's business is coming home to us via scientific technology. The amazing thing is that we take it for granted yet miss its significance.

Never before in the history of the world have so many known about so much. Never before have so many people with so many different belief systems, values, and styles of life become aware of one another. In the courses I teach on religion and science, I try to help my students appreciate how they are among the first generations in the history of humanity to develop the awareness of the many different ways people have lived. We are living during the dawn of a new era; in all the five billion years that our planet has spun and circled our Sun, we are now spinning each new day closer and closer to the new age of planet-encircling interdependence.

The new age that is dawning is an age of increasing scientific unity. When we buy our cars and television sets, when we see the TV satellite pictures of weather formations covering half our globe, when we communicate by using cellular phones, fax machines, e-mail, and the World Wide Web, we experience firsthand how the scientific technology developed mostly since the middle of the twentieth century is unifying the world. Scientific unity means, first, that contemporary scientific technology is the vehicle bringing the people on Earth closer and closer together.

As this happens scientific unity acquires a second meaning. With the increased use of scientific technology people come more and more to rely on the assumptions and methods that make such technology possible. People come to rely less on the authority of their elders and ancestors. Instead, they learn to test the new technology to see how it works, to see whether it accomplishes the promised results, to see whether it makes their lives better or at least easier. As people become educated in the scientific disciplines, they learn that the experimental method is the way to find out if a machine or an idea—or an idea translated into a machine—works. An idea is accepted not because some political or religious leader says it is true. It is accepted not because some ancient sacred text says it is true. An idea is accepted because it can be translated into expected observations of what will happen. If what is predicted actually occurs, the idea is supported; if not, the idea needs to be changed or rejected. Along with the increasing technical nature of the worldwide village, the empirical method is becoming part of the thinking of more and more human beings.

A third meaning of scientific unity involves the way in which people are coming to view the world. Let's imagine that we are scientists. As scientists we do not use personal metaphors and models to understand what

happens. We do not attempt to explain how things happen by appealing to hidden personal realities that think, intend actions, and then perform actions. For example, when we trip over a branch that has fallen in our path, we do not see this as caused by an invisible, malevolent, personal spirit as some of our ancestors did. As scientists, neither do we see all events as caused by an unseen personal deity existing beyond the universe yet acting on the universe. Instead, as we assume a scientific view of things—which is more and more common as people use the technology and experimental methods of science—we see the causes of things in nonpersonal terms, in terms of laws and forces. A shorthand way of saying this is that we understand the causes of what happens naturalistically. The world view of modern science is experimental naturalism. Naturalism means that everything is energy-matter and the information according to which energy-matter is organized. It also means that the causes of things are not personal, mental, and intentional—except when personal creatures such as humans and probably some animals are involved.

To summarize, in helping create a global village, science is unifying the world in three ways: through the use of scientific technology, through the use of empirical methods, and through seeing the causes of natural events in nonpersonal rather than in mental or personal terms.

#### SACRED CENTERS

One way to understand the diversity of religion and various conceptions of the sacred is to turn to contemporary science and outline two general features that seem to be crucial in an emerging scientific world view. These are naturalism and evolution. The modern scientific perspective holds that everything in the universe is ultimately composed of energy-matter and information and that the processes of change going on in the universe can be described in general evolutionary terms. From this starting point it is possible to outline the general history of the universe in such a way that religious diversity makes sense.

One of the primary characteristics of energy-matter is described by the second law of thermodynamics: the natural tendency of the universe is to move toward a state of random disorder. If this is a fundamental feature of the universe, how did more complex entities such as life and mind arise? Ilya Prigogine and others have wrestled with this problem in recent decades (see Prigogine 1980; 1984, 443–47; Peacocke 1984, 395–432). To resolve it, one can postulate that creation comes about through the interaction of chance and law. In the universe's fourteen-billion-year history since the big bang, there seems to have been a tendency toward establishing new stabilities in nature. This process is essentially random, often without results, until a particular combination of positive and negative energy uncovers a new stable state, heretofore a "hidden" pattern contained in the informational ground of the universe, and a particular atom such as

hydrogen is formed. The same random search for stable states continues as atoms form more complex arrangements called molecules, as molecules form still more complex stable arrangements that are self-reproducing and hence living, as living organisms discover new genetic patterns that allow them to diversify and adapt to, or become stable in, particular environments—until we humans appear on the scene. With our complex central nervous system marked by a highly developed outer brain layer called the neocortex, humans continue this process by creating new symbolic information patterns and weaving these together in what are called cultures.

Thus, according to the view of things suggested by evolutionary naturalism, as the energy-matter and information within the universe continually interacts with itself, it produces an almost infinite variety of structures. Many of these reproduce in ways that bring still greater variety of forms into being. Bringing about diversity seems to be what the universe itself is engaged in doing.

Of course, not everything created exists for all time. On our own planet, space and time are finite. In order to have the continual creation of new forms of energy-matter, life, and even new forms of thought and behavior, some old patterns must die or be transformed. Creation involves death and transformation. As the environmentalist John Muir has written, “Nature is ever at work building and pulling down, creating and destroying, keeping everything whirling and flowing, allowing no rest but in rhythmical motion, chasing everything in endless song out of one beautiful form into another” (Danner 1973, 58).

This brief evolutionary-naturalistic picture helps us see how the variety of religions and their understandings of the sacred might be rooted in the very nature of things. Can this evolutionary picture help us live more effectively with the sacred? In later chapters I suggest that it can help by developing the perspective of naturalistic theism, in which the sacred or divine is thought of as a system of nonpersonal processes within the natural world. For now, however, I would like to suggest that this evolutionary picture can help those who affirm a more traditional, personal view of God. How might the picture of creation I have developed be understood as expressing the “will of God”?

Arthur Peacocke, a biochemist and a theologian, suggests metaphorically how we might understand God’s purpose in a pluralistic world. He suggests that God and creation might be portrayed in aesthetic terms. The universe is like a cosmic symphony with God as the composer and conductor. God,

beginning with an arrangement of notes in an apparently simple tune, elaborates and expands it into a fugue by a variety of devices of fragmentation and reassociation; by turning it upside down and back to front; by overlapping these and other variations of it in a range of tonalities; by a profusion of patterns of sequences in time, with always the consequent interplay of sound flowing in an orderly way from the

chosen initiating ploy. . . . In this kind of way might the creator be imagined to unfold the potentialities of the universe he himself has given to it. (Peacocke 1979a, 316)<sup>1</sup>

If one includes in the universe not just inanimate and living forms but also the various patterns of human behavior and experience and of scientific thought and artistic expression—if one includes within the universe the various religions of the world and the diversity of ideas about the sacred—then we can regard all forms of cultural diversity, including religious diversity, as movements in the cosmic symphony composed and conducted by God. This is what God seems to be doing, which fits with our observations of diversity in our world today.

Of course, if one adopts this view of God as a cosmic composer and symphony conductor, one must give up the traditional idea of eternal, unchanging truth being expressed in any particular religion, even those religions claiming to have a special revelation. It means giving up the idea that only one religion can provide an adequate way of thinking and living. Religious thinkers of any one tradition must allow that other religions offer legitimate ways of providing meaning and moral direction for human living. In an evolutionary universe guided by a “master musician,” all have to reunderstand their faiths “not as the one and only, but as one of several” (Hick 1982, 7).

If the idea of eternal, unchanging truth is let go, then it is possible to have a concept of God, even a concept of a personal God, that complements the history of the universe portrayed by evolutionary naturalism. One can then see that the plurality of religions is the work of a continually creating God. This work comes to fruition in different ways in different times and places. Dynamic cultural pluralism is thus a part of a larger, dynamic, unfolding process of God’s universal ongoing creation. Therefore, rather than diversity being a problem, it can be appreciated, lived with, rejoiced in. Human beings, regardless of which particular scientific or religious position they espouse at a particular time and place, can find meaning for their lives by regarding their particular, present standpoints as the result of divine creativity. They can find purpose for their lives by further participating in creative transformations of their own thoughts and of themselves. In an evolving universe, continual transformation in both major and minor ways is due to sacred creativity, and maintaining the status quo means continually adapting to new situations.

#### CREATIVE MYSTERY

One way to understand the great variety of ways in which the sacred has been portrayed is to recognize that all ideas about sacred centers, including the one developed in this book, are related to particular times and places, to the cultural symbols then available to human imagination. All of these,

even though quite different, are human attempts to comprehend the mystery that has created the world. This is not only recognized today. Ancient ways of thinking have also understood that the source of all existence, which sustains and transforms the world in all its forms, is more than humans can comprehend. It is mystery.

At the same time, human beings have understood the sacred as something present in their midst. This must be so if basic human needs are to be met in relation to sacred centers. Both sacred mystery and sacred presence have shaped the ways humans have thought about the sacred. Using ideas that describe their own experience of themselves and their world, humans have created analogies to describe metaphorically the mysterious presence that works in the world continually to create and recreate aspects of the world, human society, and individual human life.

Both recognizing the mystery of the sacred and attempting to comprehend it are exemplified in the opening passage of the *Tao Tè Ching* attributed to Lao Tzu: "The Tao that can be told is not the eternal Tao. . . . Nameless it is the origin of Heaven and earth; nameable, it is the mother of all things" (de Bary, Chan, and Watson 1960, 51). In the final analysis, the ultimate source of all existence is beyond words; it cannot be thought. It is mystery. However, it must be talked about in some way or other if humans are to understand and respond to it. So is it named with an analogy: like a mother, it gives birth to all things. Such a notion of motherhood does not necessarily imply that it is humanlike, a personal reality. The analogy is relational. We are related to the Tao like we are related to our mothers.

Can we think about the sacred in ways that are consistent with the nonpersonal way of understanding things that is part of the scientific world view? I think so. Although personal ways of characterizing the sacred are more prevalent, if one looks at the cultures of the world, one still finds examples of the use of nonpersonal metaphors. I already have given one, the Tao or "Way of Heaven and Earth." Another is the Melanesian concept of *mana*. *Mana* and parallel terms in other cultures (from some Native American societies to some African peoples) refer to the "experienced presence of a powerful but silent force in things or persons, especially any occult force which is believed to act of itself, as an addition to the forces naturally or usually present" (Noss and Noss 1994, 14). While a scientifically minded person will question the existence of occult forces as such, my point here is that it is an example of the sacred characterized as a power and not as a person. Even some of the metaphors in the Hebrew and Christian Bibles speak of God in nonpersonal terms. For example, the idea of spirit originally comes from the physical realm of wind and breath. Holy Spirit is not necessarily a designation of a personal divine being, although it is associated with other metaphors that portray God in personal terms.



The existence of nonpersonal metaphors for the sacred in traditional cultures can open us up to the possibility of using nonpersonal metaphors today to speak of whatever it is that continually creates the world and life, including human life. Contemporary theologian Gordon Kaufman does just that. For Kaufman, God is a symbol that helps us unify in our consciousness all the forces and processes of nature and history that create all living things and especially human beings, and that work to make humans more humane. Like many traditional views of the sacred, Kaufman's perspective recognizes that when we consider the creation of the world, we are ultimately confronted with mystery. Yet he goes on to talk about how the symbol God points to something working within the world. Kaufman calls this immanent aspect of the sacred "serendipitous creativity" (Kaufman 1996, 101–9). The name God, he writes, designates "that creativity, that mystery, which undergirds our human existence in all its complexity and all its diversity" (p. 109).

Serendipitous creativity points to a system, the parts of which work together in unpredictable ways to create such things as new life, new truth, and new community. We can use the idea of serendipitous creativity to talk about the religious significance of biological evolution or of the birth and development of a single living organism. Various components come together in unpredictable ways to create a new species and also new individuals. For example, the interactions of our genes, our family environment, our wider society, and our natural world work together to make each of us a unique human being. All these parts working together create something of value, a particular living human organism.

We also can use the idea of serendipitous creativity to talk about progress in science. If one reads James Watson's book *The Double Helix* (1991), one can see how serendipitous creativity describes a system of discovery in which such things as experimental facts, competing scientists, and human imagination interacted to give rise to the discovery of the structure of DNA. No one fact, no one scientist, no one act of thought produced the discovery. Many of these coming together resulted in one of the major scientific discoveries of the twentieth century.

Serendipitous creativity is also a way of understanding how human communities are created. No human alone creates such communities. The interactions among humans and between humans and the natural world create communities in ways that cannot be planned or foreseen by any one individual. For example, Kaufman writes that the professional community of "modern science has certainly been a human creation, but no individual or group at the time of its origins in the seventeenth century had any notion of the complex institutional structures, modes of education and discipline, moral and communal commitments, financial and physical resources, not to say ways of thinking . . . which constitute science today"

(Kaufman 1985, 40). The same is the case with modern democratic governments. No one person simply thought out and produced the complex political systems we have today. Many individuals contributed to their evolution over time, but no one could have planned or predicted their contemporary manifestations. It is the same with the building of cities. “Any modern city is the product of human planning and intention—every brick was laid by a deliberate human act—but no one simply decided modern London or New York or Tokyo would be a fine thing to build, worked out the plans, and then brought it into being” (Kaufman 1985, 40–41).

Serendipitous creativity is a contemporary, nonpersonal way of describing the ever present working of the sacred. Even as we recognize that all human descriptions, all metaphors, are acts of the human imagination that in the end fall short of allowing us to understand creative mystery, we still seek partial ways to comprehend the mother of all things. Serendipitous creativity is one such attempt. In the following chapters, I suggest that this creativity can be thought of as a two-part process: one part gives rise to new variations in the cosmos, in life, and in human society; the other part selects and continues some of these new variations, which in turn contribute to further creation. My ideas too are only partial, only one way to think about God or the sacred for today. I recognize that I am gaining only a glimpse of the mysterious creativity that pervades the universe and the lives of each one of us. This mysterious creativity, which I partly understand, is my own sacred center in a scientific age.

#### DARWIN AND THE DANCE OF TAO

One of the most interesting concepts in ancient Chinese thought is the concept of *wu wei*, sometimes translated as “actionless action.” The following is an expression of *wu wei* in the *Tao Tè Ching*:

Under heaven nothing is more soft and yielding than water.  
 Yet for attacking the solid and strong, nothing is better;  
 It has no equal.  
 The weak can overcome the strong;  
 The supple can overcome the stiff. (Lao Tsu 1972, no. 78)

This passage illustrates the idea that the key to power and success is not to try so hard to overcome obstacles. Instead, like water one should simply “flow,” seeking the path of least resistance, living in harmony with the Tao, the “Way of Heaven and Earth.” Today we might say *wu wei* means living in harmony with the laws of nature or the way nature works.

Some time ago I gained a little more insight into actionless action as a result of some phone conversations with a friend. I had not spoken with this person for several years, but with one phone call it seemed like we just picked up where we left off. The conversation flowed with remarkable

ease. We were both surprised how easy it was to talk—and talk we did, for hours, with no effort. It all just seemed to flow.

Thinking back on that conversation, I discovered why it flowed so easily. It was because neither one of us was trying to accomplish anything. We had no goal to realize—except one, simply to talk with each other. Thus, each of us was fully focused on the conversation itself and on one another. The result was like water winding its natural course in a stream—sometimes bubbling with excitement, sometimes flowing quietly in deep patterns of our minds.

When I spoke with another friend about that conversation, I received the response, “You were dancing.” Dancing! What an interesting way to look at human relationships.

The primary challenge of dancing revolves around the question of who leads. I’ve had experiences, miserable experiences, of dancing when both of us were trying to lead. I also remember conversations that went much the same way. And I suspect there are human relationships—even long-term relationships—in which both parties try to control the relationship for their own purposes. When this happens, the relationship is likely to be a struggle. Each person is continually stepping on the other’s toes.

Dancing and relationships work more easily when there is only one person leading. One person is thus in control, accomplishing his or her goals, while the other follows. That may work fine for ballroom dancing; in fact, it’s the way it is supposed to go. However, in the dance of life, dancing with one person leading, one person in control and the other only following, can result in domination and dependence.

The best kind of dancing is when no one leads, when the leading is a back and forth sharing, when each party responds to the subtle movements, touches, gestures, and words of the other. When this happens both parties give themselves fully to the dance of dynamic relating. Then the relationship becomes a beautifully flowing movement of two people interacting with one another. Over time this can create beautiful patterns of creative friendship, partnership, and marriage. The key to this kind of zestful living is that neither participant is trying to advance his or her private goals. There is, in fact, no goal except the dance itself, being together in living life.

Dancing with no one leading, with no goal or purpose but the dance itself, is a good metaphor for portraying our contemporary scientific understanding of evolution on our planet. If one follows strictly the philosophical implications of neo-Darwinian theory, there is no overall purpose to evolution. The “copying errors” that modify species and bring new species into being are not part of any grand design. They are simply due to the continual interactions taking place within the cells of organisms. These genetic variations are translated into modified structures and behaviors of the organism. This organism then further interacts with its surrounding

environment as it seeks to feed, defend, and reproduce itself. Depending on how successful it is in doing these things, it continues its re-formed genetic line.

The point is that there are two distinct kinds of processes. One produces changes in the DNA, in the genes at the molecular level in the germ cells of the organism. The other process occurs at the level of the entire organism, between the organism and other plants, animals, and more general conditions such as climate in its environment. The fact that these two kinds of processes are not coupled together as one single process is the reason why there is no purpose other than the activities of variation and selection. For this reason, some say evolution is opportunistic: whatever changes occur at the molecular level may or may not happen to fit the then existing environment, which itself consists of other living and nonliving forms that are also constantly changing. But I prefer the image of the dance. Darwinian evolution portrays nature as constantly dancing—dancing with no one leading but with all participating and mutually influencing one another.

To say there is no overall purpose in evolving nature is not to say there are no laws. Part of what determines the success of any variation in the genes is that those variations and the resulting changes in the complete organism still obey the laws of physics and chemistry. Similarly, when two people are conversing in a way that simply flows, with the only purpose being the conversation, there are still the rules of the language being spoken. And dances, even dances with no one leading, still follow “rules” implied in the rhythms of music and of the particular type of dancing.

Nevertheless, even with the laws of nature, of language, of the dance, when one is in the interactions there is spontaneity. There is the opportunity to improvise, to “go with the flow.” And like the flow of a river within its banks, this improvisational flowing within the laws of nature and society is what makes our lives and the world in which we live a creative, evolutionary world.

In religious thought, this creativity that continually gives rise to new structures, new life forms, new thoughts and practices in a society, can be called the “dance of God.” A personalistic, theistic version of this idea is presented by Denise and John Carmody in their book *Christianity: An Introduction*. They suggest how effective people can become when they stop trying to control their actions and learn to dance with God.

There is a tantalizing dictum from Christian tradition that puts the covenantal relationship between creator and creatures in the form of a practical maxim. “Act as though everything depended on God and pray as though everything depended on yourself.” This maxim is so contrary to most Americans’ expectations that frequently they invert it. Surely action, they reason, is our human affair, and prayer is where God comes in. But deeper Christian instinct confounds many other aspects of contemporary Western culture. To the Christian, the priority in all that

we observe or do belongs to God the creator, the conserver, the concurer. She is the first cause and the final cause comprehensively.

When people really believe this, Christians assert, their action or work or doing straightens out. Like runners who have learned about stretching, they move easily, with fewer tightnesses and cramps. Like people who have appropriated a trust walk, making it something adult, they let themselves go, expecting that God will catch them when they fall. The results are often impressive. In contrast to the "Type A" behavior of the stereotypic American executive, tight-jawed and hell-bent for a coronary, those who feel God's presence keep their work in perspective, taking cues from the subtle initiatives that a given situation offers. Because they are not pushing, they can receive such initiatives, take in the delicate signs that nature or other people give of how things are flowing. Because their egos are not blocking their horizon, they can move their bodies and minds dexterously. So they resemble a realized Zen master, who has no self and can follow Buddha-nature's flow. So they conjure up T. S. Eliot, who set the still point of union with God in the context of a reality that was a dance. "Dance with me," the Christian God says. "Follow my lead, my music of the spheres." (Carmody and Carmody 1983, 20)

The Carmodys see "the subtle initiatives a given situation offers . . . the delicate signs that nature or other people give of how things are flowing," as ultimately cues from a personal God, spoken of, even if only metaphorically, as some kind of being. I have reservations, however, about such views of the sacred in an age of science. As one who wishes to think theologically within the world view of science, I want to be able to test ideas about God empirically, that is, against something observable. Can one observe God? I think so, if one considers the cues themselves as part of the creative process, if one recognizes that the kind of interaction of which the Carmodys speak is itself the divine. Then we don't need to say "Dance with me" or "Follow my lead, my music of the spheres." The invitation needs only to be "Come dance." God *is* the music. Responding only to this brings one into relation with our sacred center.

Simply to dance, with the awareness that one is part of the divine "dance of nature," means that we are expressing a naturalistic view concerning the character of the sacred. Such a view seems to correspond with the Taoist understanding that, even if it cannot be described in its final or absolute state, there is nonetheless a Way of Heaven and Earth that is like a dance, a dance of nature in which we participate with no one leading. The dance just flows, like water, rock, and shoreline interacting according to the underlying laws of nature. The dance becomes *wu wei*, actionless action.

For some, dancing just for the sake of dancing, living just for the sake of living, will not seem sufficient. They will want to know what the payoff is. If the dance—or life—is going nowhere in particular, what is the goal, the purpose of it all? I suggest that there is no purpose or payoff in terms of fulfilling projected personal interests. This is because in the dancing, in the interactions with others and the world, our interests and purposes are often transformed. For the person who wants only to further existing desires, for the person who is not open to being changed, there is no payoff in dancing with no one leading.

However, for those willing to be transformed by the dance, there are payoffs. People who are willing to give themselves to dancing with the sacred, to flowing with the Tao, are likely to be more open and accepting of nature in all its fullness and all its changes. Hence they are more likely to regard other forms of life as valuable, even when the forms are always changing as a part of the ever creative dance. Similarly, they might be more accepting of other people as they are. To dance with no one leading means to be open to the subtle cues and initiatives from others. One can only be open if one trusts, respects, and even loves others for who they really are.

But the biggest payoff is for each of us as individuals. It is the payoff of participating fully in every moment of life. Of course many of us have goals we are trying to achieve, purposes we are trying to fulfill. We are thus looking toward the future, toward trying to better ourselves, our society, the world in which we live. This may be important as long as we are not too set in our ways, in our beliefs as to what actually will make things better. If we become too sure of what is good for us and our world, we will continue to create new problems that put ourselves and our planetary global village in peril. But we may also put ourselves in peril. If we are not open to our goals and ideals becoming transformed by the grace of the dance, we may miss out on the joy of being in relationship with the divine in our midst.

Haven't you ever wondered, as I have when I constantly strain at trying to get somewhere, whether or not we are missing something? Something important? Matthew Arnold puts it this way in a haunting poem, which some churches sing as a hymn:

Calm soul of all things, make it mine  
To feel amid the city's jar,  
That there abides a peace of thine  
I did not make and cannot mar.  
The will to neither strive nor cry,  
The power to feel with others, give.  
Calm, calm me more; nor let me die  
Before I have begun to live. (Arnold 1993)

“Before I have begun to live”! That concerns me! In a life and a society always on the go, always trying to get somewhere else, is it possible that we could actually miss living? By not letting go to dance with others fully in the present, could we not die before we have begun to live?

In learning to dance with the natural world around us and with other human beings, we become more alive. This is the big payoff. We become more in tune with ourselves, others, and the natural world. We see more, experience more, enjoy more. We become part of the dance of the sacred—the dance of that system of interactions in the universe and society

that brought us into being, that sustains us in our living, and that continually transforms us as part of the ever changing future.

Carmody and Carmody portray this creative system with the metaphor of personalistic theism. But Darwinism and Taoism suggest that the interactions in nature which just happen, or in human relations when no one leads—these interactions are the dance. They are the way—the Tao. They themselves are God. “Come dance with Me,” says God personally conceived. Darwinism and Taoism simply say, “Come dance!”

#### DIVINE DYNAMICS: SPIRIT AND WORD

I suggest that concepts of *spirit* and *word* in the Christian map bring us to the same points as concepts from the science of nonequilibrium thermodynamics.

Nonequilibrium thermodynamics is the study of how more complex stable states arise out of less complex states, according to random fluctuations and inherent laws. In *From Being to Becoming* (1980) Prigogine explains how contemporary nonequilibrium thermodynamics deals with irreversible processes. These are temporal processes flowing in only one direction. They are found in open systems, that is, in systems that take in energy from outside of themselves to maintain their ordered states. When that energy increases they can evolve into more complex structures.

Based on the work in nonequilibrium thermodynamics and other scientific work regarding evolutionary theory, it is possible to generalize a pattern of creativity characterized by two sets of processes. One set introduces new variations, random fluctuations in existing systems. The other involves inherent laws of nature that operate on the fluctuations to allow the development of new stable structures. We can hypothesize that such a pattern of creativity is present in the origins of the universe in order to solve an interesting problem. As a result of the big bang some fourteen billion years ago, the universe began to expand, analogous to the way the surface of a balloon expands when blown up. The questions are, why does the universe not just expand uniformly in all directions until its density decreases and its temperature cools down to a few degrees above absolute zero? Why is anything at all created out of the initial inflation called the big bang?

It appears one must assume that two things are present along with the potential energy released in the initial inflation. First, there must be laws governing the formation of structures, so that, as the universe begins to cool, radiation forms elementary particles. Second, to prevent these elementary particles from simply expanding uniformly in all directions, one must assume fluctuations or disturbances that disrupt homogeneity. Cosmologist Joan Centrella suggests that “the soup of particles in the early universe was rippled with waves, much like the ocean.”<sup>2</sup> As these waves

moved through the early universe, they caused matter to squeeze together until it collapsed to form super clusters, galaxies, and stars.

Astrophysicist Eric Chaisson illustrates how this dual pattern of chance fluctuations and natural laws may have worked together to form galaxies. "Though probably distributed uniformly at first, matter, if left alone, tends to coagulate inhomogeneously. This is because a uniform, unbounded, self-gravitating medium is basically unstable and eventually will fragment into individual pockets of matter. Some of these statistical fluctuations will disperse, but others will grow, especially in the presence of turbulence that was surely there in the early universe" (Chaisson 1979, 27). Along with the initial fluctuations and the turbulence that initially create pockets of hydrogen and helium atoms, laws of gravity, temperature, and density are at work. Some areas of matter coagulate and continue to grow as gravity attracts still more atoms. If enough mass accumulates—"at least one hundred billion times the mass of our Sun—a reasonably warm condensation will contract gravitationally, rotate a little, heat up, radiate energy, contract some more, rotate a little faster, and so on in this cyclical fashion until an equilibrium is achieved between the inward pull of gravity and the outward forces of rotation. In this way it is thought that all galaxies were formed in the first few billion years after the bang" (1979, 28).

Within galaxies this process of creation repeats itself. Chaisson goes on to point out that "pockets of gas form, also almost by accident, via statistical fluctuation, much as for galaxies" (p. 28). If the number of hydrogen atoms in such a pocket of gas is sufficiently large, as the interstellar gas cloud collapses under the influence of gravity, it will begin to heat up due to the friction resulting from the collision of hydrogen atoms until it reaches a point at which it ignites in nuclear fusion. The fusion of hydrogen to helium releases enormous amounts of energy. Some of this energy from one star, our Sun, is potential energy for the earth. It helps create and maintain physical, chemical, biological, social, and even mental processes, as Prigogine and others describe.

When one looks at the history of the universe in terms of the scientific mapping of the process of creation through random fluctuations and natural law, one realizes that this pattern of continual creation gives rise to a wondrous proliferation of diverse forms of matter, life, society, and mind.

In the work of Prigogine, Chaisson, and others, one can see that a scientific map of creation in the universe involves two kinds of processes. The first is random fluctuations or disturbances of existing states of the universe; the second is the formation of new structures out of these disturbed states according to inherent laws. We might say that a disordering of a previous state on certain occasions and under certain conditions gives rise to new order.<sup>3</sup>

Is there anything comparable in a religious map of creation in the universe? I suspect that one can make effective comparisons between ideas



about creation in many religious traditions and those of modern science.<sup>4</sup> I see such a comparison in the conceptual map that can be drawn from Judaism and Christianity in which creation takes place by Spirit and Word.

The primary creation story of the Jewish and Christian traditions is Genesis 1. In the opening verses, the original state of creation is portrayed as a formless, watery void. It is a state of no-thingness, a state in equilibrium but with potential for all kinds of things. Creation itself begins when the Spirit of God moves over the face of the waters.

In the biblical tradition, the Hebrew word for spirit, *ruach*, has a complex set of meanings. According to the *Hastings Encyclopedia for Religion and Ethics*, it can be used physically, physiologically, psychically, and supernaturally or extra-humanly ("Spirit" 1925). It signifies the wind in all its phases; the breath of humans, which is related to the life and energy of the body; heightened human emotions; and the work of extra-human agencies that affect humanity for good or ill. In most of these understandings of *ruach*, it seems that the Spirit of God is related to that kind of energy or force which on the one hand sustains life and on the other hand disturbs an existing state of affairs. In terms of our idea of scientific and religious maps, there is a conjunction of a subway stop and a street corner. In Genesis, when the Spirit or wind of God moves over the waters, it creates the same kind of disturbance from equilibrium that fluctuations and turbulence created in the formation of galaxies. Furthermore, the work of the Spirit never ends. The biblical God is involved in ongoing creation in nature and history. The Spirit blows where it wills, like the ongoing random fluctuations described by Prigogine and Chaisson. Creation involves continual disturbances in existing systems so that new stable states can emerge—new material elements, new forms of life, new developments in society, new patterns of thought. Spirit or random fluctuation is one part of divine dynamics.

However, in both maps disturbances of existing states are only the beginning of creative activity. What is needed to complete a particular instance of creation are the laws of the universe at its various levels of existence. According to the hidden laws of nature some random fluctuations are able to evolve to new states of equilibrium. In the Judeo-Christian map, this second aspect of divine dynamics is signified by the Word of God.

In the Bible, the notion of Word of God is based on a personal model of God, according to which the divine creator speaks out the creation. When one looks at what happens when God speaks in the opening chapter of Genesis, one sees that God's word is what brings order to the universe. Perhaps because of this, early Christian thinkers were able to develop a view of a cosmic Christ as the Word of God. This view is based on the meaning of the Greek word *logos*. "In the beginning was the *logos*, and the *logos* was with God and the *logos* was God" (John 1:1). For Greek-speaking thinkers, philosophers such as the Stoics and Platonists, *logos* signified not only word but also the reason of the universe.

Thus some Christian thinkers were able to interpret the Word of God, in the beginning with God and through whom all things were made, as the underlying order of the universe. Here again we have congruence between a scientific subway stop and a religious street corner. The Word represents the underlying laws that govern the evolution of the universe, so that when the Spirit blows where it wills, randomly creating fluctuations, new stable states and new levels of existence come into being. These states and levels in turn provide a basis for further divine dynamics. The activity of Spirit and Word is continuous. It is one way of speaking about the sacred as the ever present ground of all becoming.

#### OUR SOCIAL-ECOLOGICAL SELVES

According to Ralph Wendell Burhoe we are “flow patterns.”<sup>5</sup> The core of each one of us is a unique pattern generated out of the interactions of cosmos, biology, and culture. While some rightly say we exist in a web of life, Burhoe’s idea leads each of us to see ourselves as a web of life. In contrast to what I initially think myself to be, a relatively solid substance called Karl E. Peters sitting at my computer, occupying a particular space at a particular time, Burhoe suggests that my self extends far beyond my present location. At this moment I am an individual woven out of threads of the history of the universe, my species on this planet, and my culture. I am a social-ecological self, what we might call a “big self.” So are you. To understand our social-ecological selves, let’s look at ourselves in four different ways. We might imagine this as looking through four different windows of a house. Through each window we can see different aspects of the same thing. Following Burhoe, we can call what we experience our phenomenal, cultural, biological, and cosmic aspects of ourselves.

Let’s begin with our phenomenal selves. The word “phenomenon” means appearance. It refers to our selves as they initially appear to us. When we try to look at ourselves without a mirror, what do we see? We see our bodies approximately from the chest down. To see more we have to look in a mirror, but even then we don’t see all of ourselves physically. Further, when we “look” inward, we can experience ourselves observing, feeling, and thinking. We also have an awareness that we are a subject capable of observing and to some extent directing our attention to feelings, thoughts, and body observations. If we attempt to locate this directing, observing subject—our “I”—it seems to be located in our heads, behind our eyes. But, try as hard as we might, we cannot observe it any more than that.

All this I call our phenomenal self. Our phenomenal self is what we are aware of through everyday sense observation and introspection. It does not last much beyond one hundred years. Some have claimed that the introspected self (the mind as an observing, thinking, and feeling subject) endures beyond the life of the body. It is what many have called the “soul.”

However, this concept of a substantive soul, a kind of spiritual substance that is our self-conscious subject existing beyond the grave, is called into question by modern science. This is because of evidence that correlates our observing, thinking, feeling—and our self-consciousness of these activities—with the physical and electrical-chemical states of various systems of our brains. Insofar as this correlation is a strong one, and insofar as there is evidence that at death the physical brain dies and then disintegrates along with the rest of the body, it is difficult to understand how our self-conscious subjectivity can continue in a disembodied, dis-brained way. From a scientific perspective, it seems that both our bodies and our inner subjectivity are not likely to survive beyond our physical life span. Because of this Burhoe suggests that our phenomenal body/mind is not the real core of our human nature. The real core is something that endures beyond the life span of the phenomenal self. Also, it is something that gives rise to the phenomenal self. It is our social-ecological self, our big self.

We can begin to see one strand of our big self, our cultural self, through some everyday observations. I can remember a time when I was very small, even though now I am relatively large. I also can remember a time when I did not know much or understand much. I now observe younger people and children today in the same condition. Along with my body, my mind also has grown.

A key to the growth of our minds is language. Beginning when we were very young, language entered our brains through our ears. Not only did we hear single words, but we heard patterns of words. As a result our physical brains, all the time being nourished with food, are also nurtured with the grammar and syntax, as well as the vocabulary, of our “native” tongues. We now know that people who use languages with different grammars and syntaxes think differently in some ways. So these aspects of language play a role in how we think; they help shape our minds. In effect, the language of a particular society is a recipe for the human minds in that society, a recipe encoded into the physical brains of children as they grow up. This recipe is what Burhoe calls the “culturetype,” what I am calling our cultural selves.

Along with ways of thinking embedded in language, a culturetype includes ways of doing things: ways of gathering, growing, processing, and eating food; ways of building houses and other structures of human habitation; ways of getting around with transportation; ways of playing; ways of being religious. Underlying all of these ways of doing things, manifested in them, and programmed into the brain through them, is a society's value system. At the heart of the cultural recipe lie the values, goals, and purposes that shape our actions. The culturetype shapes both my thinking and acting. It even shapes my feelings. By doing this it gives rise to much of my character and personality.

Culture is not the only thing that shapes our character and personality. Our biology—governed by another recipe, our genetic code—also plays a major role in how our phenomenal selves are woven. To “see” this clearly, we need to move beyond our own common sense observation and introspection, supplementing and refining it with the observations and theories of contemporary genetics, sociobiology, and biological anthropology. If we take this information and digest it, we can begin to create a story about how we came to be what we are.

We began as a zygote, a union of the DNA or genetic material from our two parents. Our DNA code is equivalent to an encyclopedia of information that is “read out” as the cells of the zygote multiply in various environments. The nature of the environments are critical for the DNA recipe’s expression. Equally critical is the arrangement of molecules of the DNA recipe itself.

One the one hand, if we are growing inside our mother’s womb and do not get the proper nourishment through the placenta, or if our mother is an alcoholic or drug addict, we will be born with serious brain defects. These affect our ability to acquire the language and other features of our society’s culturetype, and thus the development not only of our bodies but also of our minds, or how we observe and feel, think and act. Likewise, as we leave the womb other environments come into play. Because our brains are not fully developed when we are born, nutrition in the first six months is critical. Even after our brains are fully developed and healthy, nutrition still can affect our mental functioning. On the other hand, the DNA code itself may be “defective” for any number of reasons. The code may give us tendencies for poor eyesight, diabetes, schizophrenia, or any one of thousands of recognized genetically based disorders. These too will be factors in the development of our bodies and minds—and our resulting observing, feeling, acting, and thinking.

These considerations illustrate that our phenomenal selves are woven out of the threads of biology and culture; we are the result of genotypes interacting with various environments to develop our biological structures and functioning, and of “culturetypes” that through sense experience nourish our brains with language, behaviors, and values that shape our observing, feeling, thinking, and acting. As Philip Hefner says, our species “*Homo sapiens* is itself a nodal point wherein two streams of information come together and coexist. The one stream is inherited genetic information, the other is cultural information. Both of these streams come together in the central nervous system”—in our brains (Hefner 1993, 29).<sup>6</sup> Together they shape our selves.

There is still a third strand or stream of what we are—beyond culturetype and genotype—without which we would not be born and would not continue to exist. Looking through still another window we can see our cosmic self. Atoms and molecules, organized via amino acids as proteins,

provide the material for our biological selves. This material in turn is organized according to our genetic recipes, which also are created out of atoms and molecules, organized via nucleic acids, sugars, and phosphates into deoxyribonucleic acid, DNA.

Along with the atoms and molecules that are the basic material for us, we are constituted also by the laws of nature, the universe's information system. These laws organize energy-matter at the atomic and molecular level. They govern such phenomena as the formation and functioning of stars, the relations between Earth and the Moon that affect the tides, and all kinds of physical and chemical workings on our planet. Present throughout the universe, laws of gravity, electromagnetism, atomic interactions, and chemistry are also present in us. They provide a kind of cosmic recipe or "cosmotype" for the functioning of all things including ourselves at the atomic and molecular levels. Nature is in us as much as we are in nature.

All this analysis indicates that we are webs of reality, woven out of the threads of culture, biology, and cosmos according to recipes (structures of language and values, DNA codes, and laws of nature) in each. As webs of reality each of us is a manifestation of the evolving universe. Furthermore, as webs of reality each of us in various ways survives the death of our phenomenal selves.

Because our phenomenal selves, including our subjective experience of ourselves, are woven out of culture, biology, and cosmos, when the strands that make up what we are dissipate, our phenomenal selves die. When our physical, chemical, biological bodies cease to function, the web of our lives unravels. Our phenomenal selves do not last much more than a hundred years. However, as we live here and now, we weave new threads that become our contributions to culture, biology, and cosmos. We continue through our other selves. If we now ask how long our other selves exist, we can see that we are in fact much older and have a much longer future than we might at first suspect.

If we consider how long our culture has existed, we realize that each of us is as old as our language and the value system that shapes our living and acting. We are from five hundred to three thousand years old. If we reflect on how long our DNA recipes and other features of human biology have existed, then we are millions of years old. If we ask how long our cosmic self has existed, we must answer that we are as old as the universe itself. According to the first law of thermodynamics, energy-matter is neither created nor destroyed; it is only transformed from one pattern into another. Therefore, we contain in us—in all of our selves—after many cosmic, biological, and cultural transformations the energy that was present at the origin of the universe. The universe evolved according to its fundamental laws into hydrogen, helium, galaxies, and stars. It further evolved into heavier atoms resulting from massive exploding stars, planetary systems, and the earth filled with life. Many of these various transformations

of energy-matter have become a part of each one of us. In our own bodies, we represent a history of the universe.

How old then are we? Phenomenally a few decades, culturally a few centuries or millennia, biologically millions of years, cosmically fourteen billion years. How long will we continue? Phenomenally a few more years, culturally probably a few more centuries or millennia, biologically millions of years or (if we do not destroy ourselves first) perhaps until our Sun dies five billion years from now, and cosmically until the universe ends, which may be never. It all depends on how we think of our selves. In Burhoe's thinking, the real core of our human nature is what endures beyond the grave of our phenomenal bodies and minds. Our particular web of reality, woven out of cultural, biological, and cosmic threads, contributes back more cultural, biological, and cosmic threads—out of which other phenomenal selves can be woven. We may not have a self-conscious phenomenal immortality, a substantive soul. That is an older understanding of what we are and how we might continue. But we have something just as significant if we do not make our atomized egos the be-all and end-all of everything. We have a social-ecological-evolutionary kind of immortality as part of the fabric of an evolving universe. Seen as a web of cosmos, life, and culture, we are really big, big selves.

#### MORALITY AND MEANING FOR OUR "BIG SELVES"

In describing what it means to have a big self, I have suggested that we have a special kind of immortality—a social-ecological-evolutionary kind of immortality. This idea offers us an important implication for morality and meaning: what matters is not just how long we live but how well we live in the sense of contributing further to human culture, biological well-being, and the ecosystems of the earth. This is the primary responsibility of our phenomenal self. The phenomenal self is not as long-lived as our other selves. However, it is a critical weaving together of strands from culture, biology, and cosmos; and it is the means through which the other selves are reproduced and continue into the future. It also is the means by which our other selves can be self-consciously modified, so that the cultural-biological-cosmic "souls" of each of us—which come together to form us as we are now—can be changed for better or worse in light of how we live and die.

How we continue as "big selves" enlarges our sense of morality. What we take as significant moral issues must include not only what is important to individuals. In a communal concept of self, significant moral issues must also include what is good for our society, environment, and cosmos, because that is how each of us continues to live beyond the grave.

For example, and here each of us must answer for his or her cultural self, do we want to live the kind of life that enhances or diminishes culture? Do we want to support so-called higher forms of art or trivializations of hu-

man artistic potential? Do we want to support love, friendship, and sympathy or aggression, dehumanization, and hatred? Do we want to work for a just, peaceful, and ecologically sustainable planet or do we want to support those human enterprises that feed on greed, racism, sexism, warfare, and environmental degradation? In short, we cannot avoid having an impact on the lives of others, especially on future generations. As Max Lemberg says (1979, 373–74), there is no doubt that through our influence on others each of us will survive, weaving more threads of human culture. But the kinds of threads we weave will make a difference in how we continue in the lives of others.

The same is true of our biology. As we become more aware of how our actions affect our environment and how the environment in turn affects the development of future generations, we must recognize our responsibility to the biological future of humanity. Most already recognize responsibility to their phenomenal offspring—their immediate children. When they do not, others in society recognize the “rights” of children and pass laws against such behavior as child abuse. However, if the genes transmitted to the future are a part of our core nature, our “souls,” do we not also have a similar responsibility to protect the expression of those genes in future humans? Human reproduction can be affected by the quality of the physical-chemical world that shapes what we are. Chemical and nuclear pollution, as well as ozone layer depletion, which increases the amount of ultraviolet radiation from the Sun, can alter the physical capabilities of future generations. Our actions that affect our environment can alter the biological threads out of which humans are woven. Child abuse is not something we only can do to our own children. Environmental degradation in effect abuses children of future generations.

Further, when our phenomenal selves die, what do we do with our organs, cells, molecules, and atoms that make up our biological and cosmic selves? Here too we can perhaps enhance the quality of lives of others, not just humans but other living organisms on our planet. Perhaps we can donate healthy organs to preserve the lives of other individuals. We also can think about how to dispose of the remainder of our bodies so that our molecules and atoms can be used to weave further threads of cosmos, life, and even culture. Recently we have become concerned with recycling products we have used. Can we also think about recycling our own bodies? If we are embedded within nature and nature is in us, we might want to consider our own organic impact for better or worse on the rest of the planet.

As we begin to see some of the moral significance of having social-ecological selves, we might ask, “What kinds of general guidelines should we follow so that our big selves in their various aspects can continue?” In terms of evolutionary theory, two general things are required for the continuation of our selves. On the one hand, we must live within certain

boundaries set by the laws of cosmos, biology, and culture. On the other hand, we must be able to create, to spin alternative ways of living in order to be adaptive in a continually changing world. In other words, we must be free. Freedom is not a luxury. In a world that is constantly changing, the freedom to explore new possibilities for living is a necessity.

These two conditions are necessary for the continuation not only of humans but of all living things: they can be characterized as law and freedom; tradition and innovation; natural selection and random variation; and necessity and chance. However labeled, together they constitute fundamental requirements for continuation. These requirements for continuing to live are embedded in a more comprehensive picture of the universe. The universe evolves through all its stages as a result of fluctuations disturbing the status quo and of laws according to which some fluctuations reach new stable states—what I suggest is the divine spirit and word in the dance of creation. There is thus a permissiveness in nature, supporting new explorations, as well as a lawfulness that controls how much exploring can be done. In Christian theological terms, nature exhibits grace and judgment. Because each of us is embedded in nature, our living is granted grace and freedom to explore but is also subject to judgment and the boundaries of law.

As individual webs of culture, biology, and cosmos, these same two conditions apply to us during our lifetime as phenomenal selves. We are granted freedom to make innovations in how we live as cultural, biological, and physical-chemical creatures. Some of our explorations may even challenge the boundaries, the limits beyond which we cannot go. At times our conception of what the boundaries are may be false; we may have more leeway than once thought. However, sooner or later, we will come up against some boundaries. Attempting to go beyond them will result in our individual degeneration and death, the impoverishment or death of a society, or even the diminishment or death of our species. We will have transgressed the fundamental requirements that make the universe, including us, what it is. However, freedom also is a fundamental requirement, necessary in an ever changing world. Not to explore by chance or with intention is again to risk being subject to negative judgment.

Combining these two fundamental requirements—permissiveness and freedom on the one hand, and cultural, biological, and cosmic laws on the other—is a good way to understand what it means to be related to the divine creativity in our midst. Creativity is the process that constantly gives rise to new possibilities for being and then selects from those possibilities what continues to exist. This twofold dance of becoming is the foundation of cosmos, of life, of society, and of our big selves.

As we become related to the divine process of creation in our midst, participating in it, our lives become meaningful. Our living is in harmony with the larger scheme of things. Our phenomenal selves find meaning



here and now when we continue the past and when we build on the past in creative freedom, when within the boundaries established by the laws of nature and culture we experiment and explore to help produce the remarkable diversity of life and thought.

Sometimes our exploring may test the boundaries and perhaps even change them. Some laws of physics, chemistry, biology, and society are very stable and inviolable. It is difficult to imagine overturning the law of gravity, or doing without food and energy, or not transmitting language and values to the next generation. However, one can imagine altering other requirements that are not so fundamental. In a changing world, which values should and should not be transmitted to the next generation remains a question that can be freely explored. Even though all societies require the transmission of some set of values, the content of that set may change.

Many today find meaning for their lives in challenging values related to a hierarchical understanding of nature and human society, in which humans are superior to all other creatures and men are superior to women. Environmentalist and liberation movements are to be regarded as innovations in human cultural evolution that test the current boundary conditions embodied in codes of law, morality, and custom in many societies. These new movements are experiments that will help destabilize existing social structures in the hope that new and better social systems will be created.

If we look at biological organisms, we see that through random, genetic variation they are always experimenting, testing the boundaries, attempting to find new ways of living in a changing world. In highly stable environments, new variations are likely to fail. They are not reproduced. However, when the environment is rapidly changing, new variations may be important for survival. They may help continue the species as it modifies itself to adapt to new circumstances.

The same holds true of human societies. Part of the purpose of living is to engage in experimenting with new patterns of living. When a society is cohesive and is well adapted to its larger biological and physical environment, individual and small group experimentation is not likely to be successful. Even in periods of rapid change experimentation is still risky; however, it also is essential for the long-term viability of the society.

The point of all this is that when we explore the boundaries as well as live within their limits, we are part of an evolving universe—a total system of reality that has given rise to both the permissiveness of living and the constraints on the permissiveness. The creative process, which is the sacred center of this evolving universe, continually brings new things into being even as it continues some traditional ways of living. This process is what we have understood as divine. Living within long-established requirements of nature and culture is living according to the “will of God.”

Exploring the boundaries—even at risk—is also living in harmony with the Holy.

#### IN HARMONY WITH CRUCIFORM NATURE

I think that each view of nature I have outlined, the dualistic, conquest view and the harmony view, has some truth—but not the whole truth. These views need to be reconciled as part of a single understanding. Competition and cooperation, conquest and harmony are the yang and yin of a larger picture, a more complete understanding of nature and its value.

In constructing this larger picture I follow the thinking of Holmes Rolston, III (1988, 188–89, 192–232). Like many moral philosophers, Rolston writes about intrinsic and instrumental value. In addition, he also develops the idea of systemic value, the value of an entire system as a productive process. He further suggests that all three kinds of value are not just the ways in which humans engage in valuing. They are ways of valuing found in the natural world apart from humans. The notion of systemic value, the value of productive processes, I suggest is the value of the creative process. This value links us to the divine.

Intrinsic, instrumental, and creative value apply to both humans and the rest of the natural world. Recognizing this fact helps establish harmony between humans and the rest of nature—a harmony that is a solidarity in suffering and death as well as joy and life. Intrinsic value means that something is valuable for its own sake, in and of itself. All organisms—humans, animals, plants, and microorganisms—affirm the value of their own lives. Although humans can think about their own value and along with other animals feel their own value, the primary way all organisms affirm their own worth is biologically. We all simply live and, when threatened, struggle to continue to live. Whether conscious or not, whether felt or not, the struggle for life is a sign that an organism is affirming its own worth.

It is ironic that some say that affirming oneself is selfish and is therefore immoral. How can it be immoral to value one's own being, to struggle to do all one can to live? Unless one continues to affirm oneself, one will not live. From the perspective of Rolston's environmental ethics, valuing one's own being is not wrong, either for humans or for other species of plants and animals.

As each individual organism does what it needs to do in order to live, it uses other elements of the natural world to sustain itself. It thereby treats others as having instrumental value, as being useful to its own continuation and fulfillment. Plants use sunlight, oxygen, water, and minerals from the soil to produce sugars for their nourishment and growth. Many animals eat plants for food. In doing so, they are in Rolston's terms "capturing value," acquiring what is of value in the plants for their own life support.

Some animals capture life support value by preying on other animals. Various kinds of microorganisms do the same, preying on plants and animals, including humans. Bacteria that infect us and make us miserable, and even sometimes threaten our lives, are simply trying to capture the instrumental value we have for them so that they can live and reproduce. We humans do the same. We feed on plants and animals, killing them, destroying the value they have for themselves and thereby gaining their instrumental value for our own life support.

We don't think there is anything wrong with plants capturing the value of sunlight and carbon dioxide. Neither do we worry about animals and humans eating plants, destroying the lives of some individual specimens. However, many of us become troubled when animals feed on animals. We also become troubled when microorganisms feed on other things—calling it disease. One reason why we are so troubled is that animals and humans can experience pain and suffering when they are captured or invaded by others seeking a source of food. However, the pain is not produced just by the predator capturing its prey. What is primarily responsible for the pain and suffering are developments in the nervous systems of the animals and humans being consumed. Pain and suffering are actually part of the defense system sentient creatures have so that they will try to defend themselves, continuing to affirm the value of their own being. Pain and suffering are the price paid for the evolution of feeling and sense experiencing in animals, and of abstract thinking in humans. We wouldn't want to do away with these. We value feelings, sense experiences, and thought—even though they give rise to pain and suffering when other creatures use us instrumentally as they too try to live.

Is all of this cooperation or competition, harmony or conquest? To say it is one or the other is too simple. What we are looking for is a kind of dynamic harmony, at times a paradoxical harmony. This view of harmony affirms the intrinsic value of all living things and also recognizes that, in order to have intrinsic value, each organism must “feed” off of other forms of existence, sometimes destroying them. However, as something is destroyed—whether a quantum of sunlight, an atom of oxygen, a molecule of water, a plant, an animal, or a human being—it becomes transformed as part of another. It furthers the life of another. This is a more comprehensive kind of harmony, not the peaceful harmony of sweet breezes—the gas molecules of which also become transformed as we inhale them. It is not just the harmony of sunsets and sunrises, of shorter and longer days, of seasons of the years. It is the harmony of a dance of life and death, of growth and decay, of pleasure and pain, of tranquility and suffering. It is the harmony of the dancing Hindu deity Shiva, who continually creates, destroys, and recreates all aspects of the universe. This dynamic, dialectical harmony is the core of the third kind of value—the productive or creative value inherent in the interactions of all things.

All individual things are a part of larger, dynamic systems. When Rolston develops the idea of productive or creative value, he does so by discussing ecosystems. Ecosystems are the creative matrices that produce intrinsic value as they create new species. Calling ecosystems creative matrices indicates the significance of the interactions among organisms and between organisms and the nonliving environment. It is these interactions that create new forms of life as existing life forms reproduce, genetically vary, and contribute to the selection pressure on one another. To recognize that an ecosystem is a creative matrix is to focus on the processes of evolution as the source of much ongoing life and of new life.

However, new species are often created at the expense of the old. As organisms mutate and as some mutations are more successfully reproduced, the modified or new organisms often “win” over the old in the game of reproductive success. According to Rolston, new creation at the expense of older created things occurs most dramatically in wilderness areas where there is a great diversity of species.

The wilderness can seem a great scene of disorder, but it is also a scene of the pumping out of disorder. . . . The marvel is how dirt spontaneously assembled into Cambrian worms, later into Cretaceous opossums, and still later into . . . persons. The degradation of things in the wild is followed by nature’s orderly self-assembling of new creatures amidst this perpetual perishing. Earth slays her children, a seeming great disvalue, but bears an annual crop in their stead. This prolific generative impulse is the most startling and valuable miracle of all. (Rolston 1988, 219)

Rolston’s productive value is nothing less than what I have earlier portrayed as the creative process, the divine that is ever present in the world. As a result of this most fundamental kind of value, the earth exhibits a tendency toward ever increasing diversity of life forms. These forms of life or species become a part of the creative process itself, even as they are valuable in their own right and even as they become instrumentally valuable in supporting the lives of others. However, as valuable as they are, species do not last forever. Biologists estimate that 99 percent of the species of our planet are now extinct. Nonetheless, in the midst of massive death the long-term result is a proliferation of life. “Over evolutionary time nature has rendered most of her kinds extinct, only to generate others in their places, gradually increasing from zero to five or ten million species. This constructive tendency, little understood and mysterious, must in some sense be a good thing. Humans are an end result of it, as is the wonderland Earth” (Rolston 1988, 269).<sup>7</sup>

Extinction and creation. Death and new birth. There is harmony in nature, and humans are a part of that harmony. However, this harmony is achieved only in a process of creating and sustaining life in which death leads to new birth, in which life becomes food, at times painfully, for other life. What we humans must “value in nature is an ecology, a pregnant Earth, a projective and prolife system in which . . . individuals can prosper

but are also sacrificed indifferently to their pains and pleasures, individual well-being a lofty but passing role in a storied natural history. From the perspective of individuals there is violence, struggle, death; but from a systems perspective, there is also harmony, interdependence, and ever-continuing life" (Rolston 1988, 225).

How can we represent to ourselves this interweaving of suffering and death with creativity and life? One way is to look for concrete symbols that interpret a broad range of our experience. When I look at the ambivalence of the creative, evolutionary process that I have suggested is the dance of the sacred, I consider the Christian symbol of the cross and Rolston's suggestion that evolving nature may be regarded as if it were cruciform (Rolston 1994, 205–29; 1987, 133–47, 286–93, 326–29).

Each religion has central symbols that help us see more clearly and completely the fundamental nature of things. The family is such a symbol in both Native American and Confucian thought. The human family symbolizes the kinship of all creation. The symbol of the Tao as yang and yin is another such symbol, showing the dynamic interplay between opposites in tension in the natural world and human life. The cross of Christianity is still another. It represents the suffering of the Holy in the midst of humanity, a suffering that is redemptive, bringing about new good for others. The cross symbolizes that the fundamental ground of all being has as one of its features suffering. It opens up a window to the way things are—a window through which we see redemptive suffering as part and parcel of the nature of the world in which we live.<sup>8</sup>

In a 1994 essay in *Zygon: Journal of Religion and Science*, Rolston asks, Does nature need to be redeemed?

If redemption means being saved from the guilt of sin, then fauna, flora, rocks, and rivers have no guilt and cannot be redeemed. If redemption means being saved from the consequences of sin, then nature can be redeemed only so far as it has been ruined by human sin that infects the natural course. . . . If redemption can mean that there is a transformation by which the destruction of the old, lower life is not really destruction but renovation, the creation of newer, higher levels of life, then our inquiry is promising indeed. (Rolston 1994, 211)

Later he points out that "the question is not whether the world is, or ever was, a happy place. Rather, the question is whether it is a place of significant suffering through to something higher" (p. 218). Then he suggests that, among other things, nature is cruciform.

I do not agree with Rolston that suffering needs to lead to something higher in order to be redemptive. I think it too difficult to determine whether some new species, some new aspect of culture, some new pattern of living realized through suffering is higher than what went before. However, I think we can say that when some new good emerges through a process that involves suffering then the loss of the old and its accompanying pain and sorrow are redeemed in the new.

How then can we live in harmony with nature? It is not simply living peacefully with sweet breezes and fresh water, although keeping air pure and water clean is certainly worthwhile. It does not mean promoting death, destruction, pain, and suffering. These are part of evolving nature, but we do not need to add more unnecessarily. However, when death, pain, and suffering do occur, living in harmony with nature means being open to new possibilities for good to which they might lead. A fundamental aspect of nature is that it is cruciform. Living in harmony with cruciform nature means being open to the possibilities of new life, new truth, new beauty, and new love that emerge in the midst of suffering.

#### AT HOME IN THE UNIVERSE

In our human experience of life interwoven with death, of love interwoven with loss, we come in touch with the dynamic realm of the sacred. Throughout various times and places, humans have had to come to terms with death and loss. It is no different today. What is different, however, is a new scientific understanding that places our human living in a much larger universe, a universe that scientific thinking has depersonalized and a universe in which change is fundamental. As one educated in a scientific view of the world, I sometimes feel a sense of homelessness in the vast, impersonal, ever changing cosmos. When I face my own life struggles in the face of death, my grief at the loss of love, my expectations for new life and new love, I wonder: Do these have any meaning in the larger scheme of things? What difference does being concerned with human problems of justice make? What difference does being concerned with environmental problems make? Solving such problems, while trying to continue life and love on Earth, seems almost insignificant in the larger scheme of things.

Today our world is beset with many crises that are calling us to rethink our patterns of living—environmental crises of pollution and climate change; political crises within and between nation-states often fomented by terrorist groups; economic crises of unemployment, inflation, burgeoning national deficits that shift from one part of the globe to another. We also are confronted with positive breakthroughs in science and technology, with exciting new developments in political systems, and with countless new insights as to how to live our lives. Both the crises and the positive breakthroughs, however, are only the symptoms of a more fundamental problem—the continually increasing rate of change and uncertainty in our daily individual and collective lives. In an age of rapid change and much uncertainty, how can we find for ourselves a meaningful place in the scheme of things? How can we be at home in the universe?

The picture of cosmic, biological, and cultural evolution from the sciences supports our experience of change. Moreover, the scientific picture also suggests that we should not be surprised at uncertainty, because from an evolutionary perspective most change is brought about by chance—the

chance interaction of different causal sequences of events. These chance interactions of causal chains constantly disrupt our lives, sometimes for good and sometimes for ill—but the problem is that the disruption is usually unpredictable.

Take our individual lives as examples. They are constantly subject to chance and change. Think what happens to a well-planned day. If you are like me, you try to have a plan for your day when you get up in the morning. Often our plans are disrupted time and again in unexpected ways in our interactions with others. What are these other people trying to do? They are simply trying to carry out their own daily plans. Living with others means continuously having to adapt to the unexpected that causally affects our lives and at times even our destinies.

What applies to us on a daily basis also applies in our lifetimes—the unexpected falling in love, getting pregnant, birthing a child with genetic defects, having a heart attack in middle age, discovering cells growing out of control in our bodies. How often have our lives been changed by the unexpected? The same is true for societies and, according to Darwinian theory, for species. Different sequences of events collide with one another randomly, unpredictably, in our individual, societal, and biological lives. What meaning can we find in such a world of chance and necessity? How can we dance to the music of the spheres if the tune is constantly changing?

This problem of change by chance may underlie the other two problems we have discussed. Change may be responsible for the ancient feeling of homelessness, even in a relatively compact universe. It also may contribute in part to the desire of many people to see the ultimate source of existence as a personal supreme being.

Why did some ancients view the flat Earth under the dome of heaven not as a cozy home but as a cavelike prison? One reason seems to have been the impermanence and randomness of life on Earth. Almost twenty-five hundred years ago, Plato and his followers concluded that even though this world might appear real to our senses, the transience of things and the vicissitudes of “fickle fate” indicated that this world was only a reflection, a second-class reality. For the Platonists, for the more radical Gnostics, for the medieval Christians dealing with the same problem and influenced by Platonism, the true reality was not this cavelike world of appearance and change, of “puppets casting shadows on a wall,” but the realm of ideal, permanent forms. By abandoning the world of change and by climbing the ladder of intellectual and spiritual discipline, one could come into contact with the realm of eternal forms—the eternally true, good, and beautiful. Here some, following Plato, found order and meaning.

Some Christian theologians took over the Platonic eternal forms and called them the “mind of God.” In doing this they regarded God as analogous to the human person and human mind. It is important to recognize that the view of God as person is an attempt to express the idea that there

is an underlying order of things and that change in the world is not due to chance but is part of a divine plan. However, Christians have not attributed to the ultimate creative reality conceived as person all the characteristics of humanity, especially not those characteristics that have negative consequences. The view of God as person has been the view that a rational mind transcends the world of change and that human beings can find meaning for their lives, can find an eternal home, in the blissful contemplation of the mind of God. Thus, one might see the traditional Christian idea of heaven and the personal view of God as ways of responding to the human quest for order and meaning.

Modern science is also engaged in this quest. However, science does not seek order and meaning beyond the world of space and time in Platonic eternal forms, or in heaven and the mind of God. Instead it seeks order and meaning in this world as it searches for the laws of the universe, of human society, and of individual biopsychological life. Science too seeks order and stability in the midst of chance and change. It also seeks a home in the universe.

Science discovers that there are laws, that there is order in the universe. If we use a musical metaphor, we might say science is discovering the “beat” of the universe; it uncovers the underlying rhythms of nature. Science also discovers something else besides the underlying rhythms. It discovers that the tune is constantly changing. Discovering the laws of nature does not eliminate chance and change, because lawful sequences of events still affect each other in unpredictable ways. The ideas of nonequilibrium thermodynamics, the Darwinian theory of random variation and natural selection, and the need to use statistical analysis in the social sciences all illustrate this point. The universe is not completely orderly. It has much order, but it also is the scene of what appears to be much improvisation in a constant search for new melodies.

A good musical analogy for what science is telling us is that the dynamic universe in which we live is like jazz. I know this sounds strange, but think about it for a minute. In jazz the drums, bass, guitar, and sometimes piano provide the basic rhythm or beat. The front line instruments—trumpet, trombone, and clarinet—continually improvise on the tune by interacting with one another and thus creating new variations on the melody. Let’s think about this in relation to the universe. Not just the music of the spheres but the jazz music of the spheres! The underlying laws of nature supply the rhythm, and the constant chance interaction of causal sequences of events improvises new genetic, behavioral, and intellectual melodies in various environments. Such a universe seems to be our home. Can we see and feel ourselves at home in it?<sup>29</sup>

I think we can. Here are three things that will help us use chance creatively rather than letting it completely disorganize and destroy us. Perhaps you can think of some more. First, we can use our intelligence, our



brains that have been created in the fourteen billion years of evolution, to anticipate when we might be confronted with an increased rate of possible chance events. We often do this in our daily lives. For example, under certain traffic conditions such as rain-surfaced streets or rush hour traffic, when the possibility of chance encounters with other cars increases, we become more alert and drive defensively. Similarly, as we travel through life we can be more attentive to the rate of chance occurrences in "high density" situations. When our lives become busier and more complicated, we can be more alert to the possibility of chance encounters. We also can follow the practice of many religious leaders and contemporary psychologists and reduce the stress of chance by turning to the stability of simpler living, of solitude and silence, and of contemplative prayer and meditation. We can reenter our core selves, our sacred centers.

Second, we can place ourselves in communities of supporting persons. Families, friends, colleagues at work, and members of religious communities can be sources of support. We can support one another when chance encounters with such things as microorganisms or foreign ideas invade our bodies and brains to disrupt our physical and mental equilibrium. We can never fully anticipate physical illness or mental unrest, and both of these can range from the equivalent of a cold to life-threatening and even death-dealing blows to our orderly lives. Yet, in caring communities of people, who accept us as we are and give us their support, we can find help when the improvisations of nature and society threaten to overwhelm us.

Finally, we can use the chance encounters of life as opportunities to participate in the jazz of creative existence. Creation itself occurs through unforeseen, chance recombinations of events. Once we understand this, we can be at home in the universe, uniting ourselves with the processes that have brought us into being by joining the improvisational music of the spheres.

Let me offer as an example a situation that is not uncommon but from which I have learned a great deal. A fourteen-year-old boy's mother dies after an extended illness. The boy is left alone with his father, who fortunately proves to be good at responding to tragedy creatively, at adapting and improvising a new life, much the way a jazz trumpeter might improvise a new melody. Thus their life together is good, even though the loss of the mother and wife is felt deeply. Then the father plays still another tune; he remarries and brings himself and his son a wonderful new wife and mother and a new, large, and charming array of aunts, uncles, and cousins. More than half a century later I am still benefiting from the new relationships. I'll always be thankful that my father was a good improviser, that he responded creatively to chance events that in one sense were quite destructive. Dad was not a musician in the ordinary sense of the word, but when it came to dealing creatively with chance events, he was an excellent front line player of the jazz of life.

One trick of living, I suggest, is not only to try to control the rate of change in our lives, not only to support one another in times of need. It is also to welcome chance—to welcome the causal sequences of events that impinge unexpectedly on our lives—as giving us opportunities for growth. Even as we live our lives on Earth here and now, we can join the music of the spheres. We can learn to follow the fundamental rhythms, the laws of nature, in the dance of life. And in keeping with the rhythm or beat we can continually improvise new patterns of living. In doing so we join the rest of the universe in the ongoing process of dynamic creation. We come to feel at home in an evolving universe.

## NOTES

1. This entire essay offers an excellent summary of thermodynamics in creation with a helpful philosophical and theological interpretation.
2. Centrella is quoted in *Science* 83:4 (December), 8.
3. Since I initially wrote this section on nonequilibrium thermodynamics and creation, others have called my attention to similarities with chaos theory. Chaos theory also sees creation occurring through unpredictable variations that give rise to new order in a universe in which everything is interconnected. Ian Barbour (1997, 181–84) gives a good, brief summary of both nonequilibrium thermodynamics and chaos theory. Chaos theory, nonequilibrium thermodynamics, and evolution—combined with computer and information science—inform the original and thought-provoking philosophical theology of James E. Huchingson (2001).
4. Jeffrey Wicken has developed one such correlation with an understanding of creation from ancient Hinduism. He draws a parallel between the notion of the creator deity Brahma breathing out the universe and the dissipation of energy from states of potential work to states of thermodynamic equilibrium via the creation of structures organized in the manner described in this reflection, following the work of Prigogine (Wicken 1984, 487–505).
5. See Peters 1992, 9–25; Burhoe 1981, 112–50. Suggesting that the soul is whatever continues as the real core of a human being, Burhoe writes: “The real core of human nature is not any particular body but an enduring pattern of flow. The flow pattern is generated by the interaction of the energy and boundary conditions set by habitat (or cosmotype), genotype, and culturetype, resulting in unending successions of ever-evolving levels of living forms” (p. 140). My thinking in this section is an attempt to explain the meaning of this passage.
6. For a proposed scientific model of biocultural evolution that underlies the position developed here, see Hefner 1993, 198. The model was developed by biological anthropologist Solomon H. Katz (1993).
7. Rolston writes that “the Earth-system does prove to be pro-life; the story goes from zero to five million species in five billion years, passing through perhaps five billion species that have come and gone en route” (1999, 364).
8. John F. Haught also relates the Christian symbol of the cross to biological evolution: “In the symbol of the cross, Christian belief discovers a God who participates fully in the world’s struggle and pain. The cruciform visage of nature reflected in Darwinian science invites us to depart, perhaps more decisively than ever before, from all notions of deity untouched by the world’s suffering. Evolutionary biology not only allows theology to enlarge its sense of God’s creativity by extending it over measureless eons of time; it also gives comparable magnitude to our sense of the divine participation in life’s long and often tormented journey” (Haught 2000, 46).
5. The metaphor of jazz first came to me when I read Arthur Peacocke’s “Chance and the Life Game” (1979a), which is a slightly modified version of the third chapter of *Creation and the World of Science* (1979b, 86–111). Peacocke develops the musical analogy with a Bach fugue. Following his lead, I thought that jazz also illustrated his point. Ann Pederson beautifully develops the jazz metaphor in her book *God, Creation, and All That Jazz: A Process of Composition and Improvisation* (2001). In her preface she credits a conversation with Peacocke as suggesting to her

the “model of God as composer [and] also . . . that the improvisational arts of jazz and the blues might be the modern musical idiom for expanding a classical model of God and the world” (p. vii). Peacocke himself comments on the significance of music in providing models for portraying God’s creative interaction with the world in *Theology for a Scientific Age: Being and Becoming—Natural, Divine, and Human* (1993), 173–77. He suggests that both the fugue and jazz introduce the idea of improvisation into “the model of God as composer [which] incorporates that element of open adaptability which any model of God’s relation to a partly non-deterministic world should, however inadequately, represent” (p. 175).

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