

## Science as Sacred Metaphor



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## An Evolving Revelation

*Elizabeth Michael Boyle, O.P.*



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Dedicated to

MARY OF NAZARETH

who

being neither scientist nor theologian

said “Yes” to the mystery

in whom all that exists

lives

and moves

and has its being.



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## INTRODUCTION

*You are not here to verify,  
Instruct yourself, or inform curiosity.  
. . . You are here to kneel  
Where prayer has been valid.*<sup>1</sup>

These words of T.S. Eliot, whose spiritual journey through science, metaphysics, and comparative religion concluded on his knees in his ancestors' chapel, announce the purpose of this book: to create a sacred space at the intersection where science and faith meet. For those who pray daily, the Word itself is the familiar meeting place, the door to one of those old, prayed-in churches, warm with the presence of all who have prayed there before us. The space to which I now invite the reader is like a new church, uninhabited by friendly ghosts, stripped of familiar icons and pious clutter, somewhat cold at first, but welcoming the light, waiting to be prayed into a home. In this place, scientific inquiry and the vision of faith will neither prove nor disprove each other. Instead, as its title suggests, both modes of perception will enrich each other through the poetic device of metaphor.

Scientists and theologians employ metaphor, not as literary ornament, but as a tool of discovery, analysis, and exposition. As such an instrument, sacred metaphor approaches scientific theories and discoveries as symbolic "texts" in an evolving revelation of divine truth. According to the evangelists, Jesus himself pointed to the physical world as a revelatory metaphor and a guide to the divine vision for life (e.g., Luke 12:22-27; John 12:24). Were he teaching today, the same Jesus who used the lives of birds and wildflowers as physical symbols for divine providence would probably be saying: "Consider the implications of lilies and stars, of quarks and quanta, earthquakes and

volcanoes. Learn from the drama of life-out-of-death in everything from seeds to tsunamis.”

When we are careful to avoid “reducing revelation to what can be humanly comprehended by analogy,”<sup>2</sup> metaphor can carry us to its own limits, where contemplative prayer takes over and becomes an act of communion with mysteries beyond comparison or paraphrase. Science, as well as the “secular” arts, can facilitate that participation. Historically, in the United States especially, the combination of science with religion has tended to provoke fears that erect walls covered with barbed wire. When science confirms our own most profound intuitions of the sacred, however, we can enter laboratories and observatories with the kind of reverence and awe once reserved for chapels and cathedrals. Through the concept of sacred metaphor, scientific exploration can open the door to prayer.

Obviously, a work based on such a subjective, poetic response to scientific material can be neither comprehensive nor systematic. Hence this volume is restricted to a highly selective sampling of those scientific theories that have confirmed and/or enhanced my personal faith experiences. Moreover, even as I use the term “sacred metaphor,” I acknowledge that ever since the Incarnation destabilized all dualisms of sacred and profane, we can use the term “sacred” only to describe an *experience* of our own optimum humanity. John Haught, director of the Center for Science and Religion at Georgetown University, seems to endorse this form of validation when he writes about evolution as a mode of revelation:

Religious thinkers can deal with evolution in a meaningful way only if they do so on the basis of their own experience of the sacred as mediated through the faith communities to which they belong.<sup>3</sup>

Distributed throughout these pages will be testimony from many whose careers in the natural sciences have strengthened their faith in the supernatural. Such creedal expressions by contemporary scientists, however, must not be invoked as “proof texts” for religious faith. As Sharon Begley warns in her introduction to *The Hand of God*, the impersonal mysterious force to which most scientists refer does not resemble the caring, intervening, personal God of the Judeo-Christian tradition.<sup>4</sup> At the outset, therefore, let me stipulate several basic premises concerning the nature of perception in science, poetry, and prayer.

## *Mystery & Metaphor: Some Basic Premises*

❖ *First, all human knowledge is ultimately subjective.* Popular mythology to the contrary notwithstanding, purely “objective” science is an unscientific term. Still less legitimate are claims for a “purely objective” theology. All reputable scholars acknowledge the epistemological premise that *the knower conditions what is known*. Moreover, each knower, including the authors of Scripture and its interpreters, emerges from a historical intellectual context that includes constantly revised scientific data. In fact, historians of religion can demonstrate that since the beginnings of the human quest for knowledge, evolutions in theology have consistently followed revolutions in science.<sup>5</sup> No matter how neutral the language of the final presentation, the scholar’s choices, the allure or disdain with which she engages her subject, all—for better and worse—pass through the sieve of individual personality and emerge as “embodied knowledge.”<sup>6</sup> Scientists and theologians are no exceptions; poets never pretend to be. To paraphrase Emerson,<sup>7</sup> “There is no theology, only autobiography.”

And just as human character develops in response to hardship, so throughout the history of ideas, progress seems to thrive on conflict. Over the past half century, in particular, some theologians seem to have benefited from the process once described by Arthur Koestler: “When two irreconcilable matrices of thought and experience coincide in the mind, the result is religious or scientific breakthrough.”<sup>8</sup> Such breakthroughs have gradually modified, though far from dissolved, the legendary hostility between scientific and religious worldviews. During the last three decades, Christian scholars in increasing numbers have been publishing works that boldly endeavor not only to reconcile but arguably to enhance the Western religious tradition with contemporary scientific thinking. In the United States alone the last decades of the twentieth century witnessed the annual publication of over two hundred new titles interfacing science and religion.<sup>9</sup>

In my experience, theological pioneers exhibit two general temperaments. On the one hand, I have listened to the wild and witty spellbinder, a courageous maverick gleefully discharging six-shooters as he gallops over the Nicene Creed into a new frontier. His style seems dominated by a desire to shock, disturb, and take advantage of the current climate of eroded clerical credibility. On the other hand, I have read cautious, scholarly treatises whose exhaustive intellectual analyses

conclude with the phrase “I have come to believe.” For me, this sentence evokes the visual image of a head bowed in prayer, bathed in light from shattered stained-glass windows that open to the sky. Although writers of both types occasionally venture beyond where I am ready to go, I put my trust in a theology that appears to be forged in the crucible of prayer.

Study of these theologians has led me to the hypothesis that autobiography determines the limits of disbelief. For example, Dominican theologian Cletus Wessels, who has assiduously reexamined much traditional Catholic dogma in the light of evolutionary cosmology, reinterprets the doctrine of the Resurrection, not in terms of strict science, but in the light of what he has experienced personally since the death of his father.<sup>10</sup> Having reached my theory independently, I later came across cognitive research which concludes that people tend to seek data and interpret evidence to sustain beliefs. One such study concludes: “Both religious and anti-religious belief systems are often almost impervious to data.”<sup>11</sup>

Some of us, who are neither scientists nor theologians, process both science and theology as poetry. The more I study spirituality in relation to science, the more I have become convinced that because of the inherent subjectivity of the human quest, personal faith experience (or the lack of it) predisposes some to reduce God to a mythic metaphor for science, while others celebrate science as a cosmic metaphor for God. For the former, eventually “nothing is sacred”; for the latter (including this author), everything is.

❖ Hence my second premise: *Both scientists and theologians make acts of faith as they explore parallel paths in the land of mystery.* Although many scientists insist that mystery is a temporary term for territory soon to be conquered by technology, that conviction itself constitutes a quasi-religious belief. For example, scientists engaged in the perennial search for a “Theory of Everything”<sup>12</sup> are motivated by their belief that there is one force, *the source beyond and the power within all that exists.* Admitting that they do not know *what it is*, scientists nevertheless attest *that it is.* With humiliating alacrity, skeptics dismiss each new development in the quest for the Theory of Everything with the type of scorn usually reserved for popular myth; for example, “This is the book archeologists may study for a rigorous, comprehensive view of how the twenty-first century inhabitants of the third rock from the sun believed the world worked.”<sup>13</sup>

At the end of 2004, *The Edge*, a website devoted to science, published its annual question to scientists: “What do you believe is true even though you cannot prove it?”<sup>14</sup> Of the 120 respondents, only a handful named a religious dogma. Instead, secular scientists named over a hundred “scientific” concepts that they firmly believe are both absolutely true and absolutely unprovable. Two years before *The Edge* posed its provocative question, an international gathering of scientists celebrated the one-hundredth anniversary of quantum physics. Reporting the event, science writer Dennis Overbye commented that the field of quantum mechanics entertains “concepts that sound like mythology,” for example, “that a subatomic particle like an electron can be in two places at once, everywhere or nowhere, until someone measures it.”<sup>15</sup> In a scenario resembling the division of assets in a “friendly divorce,” scientists and theologians seem to be ransacking each other’s lexicons for a vocabulary to describe *mystery* that enjoys both secular sophistication and spiritual power.

❖ Therefore, my third and final preliminary premise: *The common language of science and religion is metaphor*. Both the content and the method of this book depend upon a nuanced grasp of this term. Neither metaphors nor symbols are “synonyms.” Like the artist Magritte, writers must keep in mind that words themselves are like two-dimensional paintings—inadequate symbols of the reality they represent.<sup>16</sup> Paul Tillich goes so far as to say: “. . . a religious symbol is idolatrous unless it suggests its own inadequacy.”<sup>17</sup>

Both adherents and opponents of the new science-based theologies must be wary of literalism, for in relation to God, all literalism is idolatry. For example, when scientific panentheists speak of the universe as “in God,” they must be clear that nothing is “in” God as in a container, that all spatial locations of God are metaphors. Without observing this caveat, those scholars who exploit metaphor can sometimes replace biblical literalism with a physical literalism that is no more “true” than the illusion it is intended to supplant. The more attractive the metaphor, the more acute the danger of literalism, especially when either scientists or theologians invoke religion to invest their agendas with spiritual and ethical urgency. (One example of this physical literalism would be the abuse of ecofeminist Sallie McFague’s widely quoted metaphor of the earth as “God’s body.”)<sup>18</sup>

Understood rightly, however, metaphor embraces something much richer and more exciting than equivalence. The finest definition of metaphor I have ever encountered was performed for me by Bernard Bragg,

the actor known as the Lawrence Olivier of the National Theatre of the Deaf. Explaining that there is no “word” for metaphor in American Sign Language, he spontaneously invented a compelling visual poem. At first he held his hand before his face, mimicking a mirror; then he promptly rejected that static image. “A metaphor is more like the image in a swiftly moving stream,” he continued signing, “a stream with shallows and depths, brightened by sun-darts, darkened by storm clouds overhead, freshened by melting snow and rainfall, widening and narrowing as it pursues its course.” As each action generated new inspiration, the actor’s performance itself became a metaphor for metaphor. Twenty-two years after this interview,<sup>19</sup> I came upon comments by the physicist-theologian Ian Barbour that read like a prosaic summary of Bragg’s creative definition:

A metaphor cannot be replaced by a set of literal statements because it is open-ended. . . . It cannot be paraphrased. . . .

A metaphor is not an illustration of an idea already explicitly spelled out, but a suggestive invitation to the discovery of further similarities.

The meaning of a metaphor survives at the intersection of the two perspectives that produced it.<sup>20</sup>

Following the brook of metaphor from the shallows of the known to the depths of the unknown can be a continual preparation for contemplation: “Dear Lord,/we lurch from metaphor to metaphor,/Which is—let it be so—a form of praying.”<sup>21</sup>

### *Naming and Un-Naming God*

As more and more scientists accept the premise that “science is a metaphorical enterprise at heart . . . , closer to philosophy and even theology than anyone thought fifty years ago,” religious thinkers too must accept the limits of metaphor in relation to God, where it is truly “a strategy of desperation.”<sup>22</sup> Hence, in this cross-disciplinary study we need to observe two related caveats. First, science enthusiasts often slip into a subtle inversion of the subject/predicate relationship in the science/theology equation. Even some contemporary theologians now seem to revert to ancient paganism’s mode of making God a mythic

version of science.<sup>23</sup> With deep respect for the revelations of science, this book reverses priorities, choosing science as one way of talking about God as the primary reality, with the universe and everything in it as the symbolic poem of God's self-revelation.

Second, and more importantly, awareness of metaphor, its power and its limitations, is nowhere more urgent than in thinking and speaking of God. As recently as 1988, John Paul II felt it necessary to remind us: "All language in relation to God—including the title Father—is by way of analogy, since God transcends all human experience, categories, and speech."<sup>24</sup>

Among contemporary scientists, and even theologians inspired by science, are those who scrupulously avoid "God language," some out of reverence for the Unpronounceable Name, some out of fear of losing respect in academia, most out of a profound and sincere agnosticism. As a result, scholars have generated a "New Age" thesaurus of neologisms for what lies beyond their senses. A sampling of such terms demonstrates how remarkably science has preempted the language of mysticism: "the parental void containing all ultimate secrets and underlying laws"; "the indefinable, immeasurable, unbroken whole that includes the entire universe"; "the ground for the existence of everything, including us." Atheistic synonyms for God run the gamut from huge—"the ocean of cosmic energy"—to subatomic: "the wave pulse which launched our universe." Oxymorons like Brian Swimme's "all nourishing abyss" and Dana Zohar's "quantum vacuum" replace references to a creator. Having reviewed all this tortuous nomenclature, Wessels opts for a metaphor to which one can pray: "unconditional, extravagant love."<sup>25</sup> Poets, for whom metaphor is *lingua franca*, are also the first to recognize its final inadequacy: "This God recedes from every metaphor,/this love shows/Itself in absence, which the stars adore."<sup>26</sup>

### *Thirteen Ways of Looking*

Wallace Stevens' classic "Thirteen Ways of Looking at a Blackbird" can be read as a meditation on varieties of perception. Two stanzas in particular inspired the organization for this book:

Among twenty snowy mountains,  
The only moving thing  
Was the eye of the blackbird.

. . .

I do not know which to prefer,  
The beauty of inflections  
Or the beauty of innuendoes,  
The blackbird whistling  
Or just after.<sup>27</sup>

I have adopted Stevens' central metaphors to organize all chapters under uniform subtitles. Each chapter will begin with "Ways of Looking," that is, some preliminary definitions and distinctions for a general frame of reference. Next, in the section "The Eye of the Blackbird," I will elucidate how the scientific theory under discussion helps us to see God through *the moving eye of science*. Finally, under "Inflections and Innuendoes," I will suggest the implications of scientific theory for Christian faith in practice.

### *How to Use This Book in Preparation for Prayer*

As a non-specialist, I can assure the reader with a limited knowledge of science that we do not have to be professional musicians to be moved by the beauty of music or to appropriate its wordless eloquence for prayer. Reflecting poetically and receptively on scientific data as a sacred text, we can go beyond analysis to enter into communion with the creative mystery at its heart. For several years my own pedestrian explorations in the world of science have developed into an informal ritual that those who read these pages might like to adapt to their own meditation on scientific materials. Every Tuesday morning as I peruse the pages of the *New York Times*, I turn to the science section to read reports of new discoveries ranging from astrophysics to microbiology. Then I reflect on these statements as one ponders the poetry of Scripture, praying to "see" the image of God and "hear" the hopes of God revealed through the evolving revelation of our sacramental universe.<sup>28</sup> Usually, out of this reflection comes a brief prayer. Finally, I let go of all data and images and rest in the Source of it all.

One could say that this little ritual, invisible to my companion at the other end of the breakfast table, has transformed the dining room into a "sacred place."<sup>29</sup> Sometimes the energy of that encounter carries me into further "participation" through reading and writing poetry. Those with limited time might prefer to use the brief quotations that open each chapter as texts for meditation. Individually or together, they could inspire a briefer ritual than the one I have described. Savoring the poetry and pondering

the implications of these statements by scientists, mystics, and poets could open the door to contemplative prayer as verses of Scripture do.

Science headlines and poetry inspired by them act like a spacecraft's booster rockets. Once the mission is launched, the rockets must be discarded as unnecessary baggage. And sometimes truth will demand that we jettison other, more precious baggage—like our favorite ideas. Those who learn how to use science poetically to launch a fresh experience of faith will relinquish forever all hope of finding scientific “proof” for the book of Genesis or the content of the catechism. A broader understanding of revelation will empower them to emancipate themselves from all forms of idolatrous literalism, including some neo-pagan<sup>30</sup> worship of the “new science.” Both challenged and reassured, they will continue their search through outer and inner space in the company of fellow explorers “Who are only undefeated/Because we have gone on trying.”<sup>31</sup>

### *A Word About Language*

Regrettably, many valuable citations from theologians and spiritual writers of earlier generations use masculine pronouns for the Deity. Copyright restrictions prevent my altering them. Moreover, retaining sexist language, far from enshrining sexist attitudes, can actually jar the reader into reexamining unacknowledged assumptions. As feminists themselves appreciate, every alteration of a text is a translation. “Translated works are Trojan horses, carriers of secret invasions. They open the imagination to new images and beliefs, new modes of thought, new sounds.”<sup>32</sup> Already translation of Scripture into inclusive language has progressed from the invasion to the “occupation” stage, so that now citations in sexist language have the effect of drawing attention to outmoded imagery and beliefs. Our intention in the pages that follow is to spearhead simultaneously an invasion into and a retreat from a land whose poetry is finally untranslatable.

## NOTES

<sup>1</sup> T. S. Eliot, “Little Gidding,” in *The Complete Poems and Plays* (New York: Harcourt, Brace and Company, 1952).

<sup>2</sup> John Haught, *Mystery and Promise: A Theology of Revelation* (Collegeville, MN: Liturgical Press, 1993) 2.

<sup>3</sup> John Haught, *God after Darwin: A Theology of Evolution* (Boulder, CO: Westview Press, 2000) x.

<sup>4</sup> Sharon Begley, *The Hand of God: Thoughts and Images Reflecting the Spirit of the Universe*, ed. Michael Reagan (Philadelphia: Templeton Foundation Press, 1999) 27.

<sup>5</sup> See, for example, Edward Grant, *The Foundations of Modern Science in the Middle Ages* (Cambridge: Cambridge University Press, 1996); Gregory Riley, *The River of God: A New History of Christian Origins* (New York: HarperCollins, 2001).

<sup>6</sup> Sallie McFague, *Models of God: Theology for an Ecological, Nuclear Age* (Philadelphia: Fortress Press, 1987) 67. After 1962, Thomas Kuhn's widely read theory of the "paradigm-shift" influenced scientists to acknowledge that the criteria for judging scientific theories are "paradigm-dependent." *The Structure of Scientific Revolutions* (Chicago: Chicago University Press, 1970). Therefore, some surrendered the claim that science, as "theory-independent," is "objectively" superior to religion.

<sup>7</sup> "There is no history, only biography."

<sup>8</sup> Arthur Koestler, *The Act of Creation*, cited by Rosemary Haughton, *The Passionate God* (New York: Paulist Press, 1981) 1.

<sup>9</sup> For example, David C. Lindberg and Ronald L. Numbers, *God and Nature: Historical Essays on the Encounter Between Christianity and Science* (Berkeley: University of California Press, 1986); Fortress Press, "Theology and the Sciences Series"; Orbis, "Science and Religion Series"; as well as the publications of the John Templeton Foundation and the Center for Theology and Natural Science at Berkeley, California.

<sup>10</sup> Cletus Wessels, *Jesus in the New Universe Story* (Maryknoll, NY: Orbis Books, 2003) 124–125.

<sup>11</sup> Richard A. Nesbitt and Lee D. Ross, *Human Inference: Strategies and Shortcomings of Social Judgment* (Englewood Cliffs, NJ: Prentice-Hall, 1980).

<sup>12</sup> "The ultimate explanation of the universe at its most microscopic level, a theory that does not rely on any deeper explanation . . . which would provide the firmest foundation on which to build an understanding of the world." Brian Greene, *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory* (New York: W. W. Norton, 1999) 17.

<sup>13</sup> George Johnson, "A Really Long History of Time," rev. Roger Penrose, *The Road to Reality: A Comprehensive Guide to the Laws of the Universe* (New York: Alfred A. Knopf, 2005); *New York Times Book Review* (2 February 2005) 14.

<sup>14</sup> [www.edge.org](http://www.edge.org). A sampling of responses was published under the title "God (or Not): Physics and, Of Course, Love: Scientists Take a Leap," *New York Times* (4 January 2005) F3.

<sup>15</sup> "Quantum Theory Tugged and All of Physics Unraveled," *New York Times* (12 December 2000) A2. The seven hundred physicists in attendance admitted *belief in*, but not *understanding of*, the theory considered to be the foundation of modern science.

<sup>16</sup> Magritte's most famous painting is a flat illustration of a smoker's pipe with a simple sentence superimposed: "Ce n'est-ce pas un pipe."

<sup>17</sup> Cited by Ian Barbour in *Myths, Models, and Paradigms: A Comparative Study in Science and Religion* (New York and San Francisco: Harper and Row, 1974) 14.

<sup>18</sup> Sallie McFague, *The Body of God: An Ecological Theology* (Philadelphia: Fortress Press, 1993). McFague first adopted the term introduced by process theologians Fisher and Hartshorne in her earlier *Models of God*, but it received wider currency after the publication of the eponymous volume.

<sup>19</sup> Personal Interview, Eugene O'Neill Theater Center, Waterford, Connecticut, 24 June 1982.

<sup>20</sup> Barbour, *Myths, Models, and Paradigms*, 14.

<sup>21</sup> Andrew Hutchins, "Praying Drunk," in *Upholding Mystery: An Anthology of Contemporary Christian Poetry*, ed. David Impastato (New York: Oxford University Press, 1997).

<sup>22</sup> McFague, *Body of God*, 33, 93.

<sup>23</sup> For example, Michael Morwood, *Praying a New Story* (Maryknoll, NY: Orbis Books, 2004); Diarmuid O'Murchu, *Evolutionary Faith: Rediscovering God in Our Great Story* (Maryknoll, NY: Orbis Books, 2003); *Quantum Theology: Spiritual Implications of the New Physics* (New York: Crossroad, 2003).

<sup>24</sup> John Paul II, "Mulieris Dignitatem: On the Dignity and Vocation of Women," *Origins*, vol. 18, no. 17, #8 (6 October 1988).

<sup>25</sup> Wessels, *Jesus in the New Universe Story*, 126ff., 136, et. al.

<sup>26</sup> Mark Jarman, "Sonnet 4," *Questions for Ecclesiastes* (Ashland, OR: Story Line Press, 1997).

<sup>27</sup> Wallace Stevens, *Wallace Stevens: Collected Poetry and Prose* (New York: The Library of America, 1996).

<sup>28</sup> The fact that I do not fully comprehend the scientific detail of all that I read does not diminish the sense of revelation in this process, for, with surprising frequency, my inspiration comes from a scientific "revelation" scientists admit they cannot fully comprehend either.

<sup>29</sup> ". . . sacred place is ordinary place, ritually made extraordinary." Belden C. Lane, *Landscapes of the Sacred: Geography and Narrative in American Spirituality* (Mahwah, NJ: Paulist Press, 1988) 19.

<sup>30</sup> The *New York Times* "Religion Journal," for example, reports that one of the fastest-growing religions in North America is "paganism, the umbrella term for all nature-based belief systems and spiritualities." It includes among its devotees many former Christians. Erin Goldscheider, "Witches, Druids, and Other Pagans Make Merry Again," *New York Times* (28 May 2005) B7.

<sup>31</sup> T. S. Eliot, "The Dry Salvages," in *The Complete Poems and Plays, 1909–1950* (New York: Harcourt Brace, 1980).

<sup>32</sup> Jane Hirshfield, "The World Is Large and Full of Noise: Thoughts on Translation," in *Nine Gates: Entering the Mind of Poetry* (New York: Harper Perennial, 1997) 56.



## *Chapter One*

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# REFLECTIONS ON A QUANTUM UNIVERSE

*“For your immortal spirit is in all things.”*  
(Wisdom 12:1)

*“Nature is visible spirit, and spirit is invisible nature.”*  
(Friedrich Schelling)<sup>1</sup>

*“Everyone who is seriously involved in the pursuit of science  
becomes convinced that a spirit is manifest in the laws of the Universe  
—a spirit vastly superior to that of man. . . .  
In this way the pursuit of science leads to a religious feeling of a special  
sort . . . quite different from the religiosity of someone more naïve.”*  
(Albert Einstein)<sup>2</sup>

*“Thinking of God as the living awareness in the space between the atoms  
. . . gets us past some of the great theological divides. . . .  
Is God immanent or transcendent, internal or external, composed or  
compassionate?  
Like the question of whether the atom is a wave or a particle,  
The answer is ‘Yes.’”*  
(Tom Mahon)<sup>3</sup>

*“Your kingdom come  
To this out-of-the-way corner of the universe  
With its 90% of matter that is invisible.”*  
(Ernesto Cardenal)<sup>4</sup>

Those who view the world through the twin oculars of faith and science find the language of the laboratory and the planetarium a rich source of metaphors for imagining realities inaccessible to the senses. Each day, advances in technology expand the boundaries of visible creation by exposing worlds-within-worlds heretofore invisible to the naked eye. Meanwhile, throughout the final decades of the twentieth century, with increasing insistence, some theologians have also expanded the traditional parameters of the biblical phrase “according to God’s likeness” to embrace not only Jesus Christ and humanity but also all creation.<sup>5</sup> As quantum physics penetrates ever deeper into the interior of nature’s subatomic wilderness, worshiping Christians reflect: “How does this universe also mirror the divine image?” In this spirit some speculations of theology and of quantum physics can be read as parallel epiphanies. When we approach the discoveries of science prayerfully, with reverence like that which we bring to the written Scriptures, these parallel texts can put us in touch with our own sacredness, *even and especially when we do not fully understand their technical detail.*

For centuries ordinary human beings have most often recorded their sense of the sacred in the presence of *immensity*. Oceans, mountains, canyons, outer space—all stun us into inner silence and provoke a nameless gratitude for our participation in something incomprehensibly vast. The revelations of quantum physics invite us to experience this same awe in the presence of the *infinitesimal*. Quantum theory suggests that the mystics’ intimations of an energy “whirling,” “circling, encompassing,” “quickenning,” and “permeating”<sup>6</sup> every visible reality have a basis in the “hard sciences,” that there is, in fact, “something more” within and beyond our most compelling sense experiences.

### *Ways of Looking: Definitions and Distinctions*

How exactly do we define a *quantum universe*? It is both a relief and a dilemma to learn that very few professional scientists claim competence to explain quantum theory clearly to non-scientists. Yet, to an adult who has devoted a lifetime to the two professions of religion and literature, the world exposed by quantum physics is not unfamiliar, and I find myself in the position of Moliere’s “Bourgeois Gentleman,” who was astonished to discover that he had been “speaking prose all his life.”

Quantum theory offers a scientific synonym for that invisible hemisphere of reality that many of us have known personally and/or read

about in poetry and mystical literature all our lives. While the mystics and poets have long compelled respect for their ecstatic intuitions of quantum theory, I have come to believe that contemporary science forces us to do more than that. Science forces us to *own* its spiritual implications and moral imperatives. So, for the spiritually committed but scientifically uninitiated, here is a brief introduction to some “bare bones” of quantum theory that can enhance our idea of God.

In the context of spirituality, perhaps it is best to define the quantum universe not as a world but as a worldview, the scientific worldview that began to open up in the 1920s, when scientists replaced the classical universe of *solid objects* with an invisible network of *energy* in particles, fields, waves, and flows. Incredibly powerful microscopes have revealed that nothing that we see is a “thing” at all. Every speck of physical matter is, in fact, a minute, even subatomic *event* within a vast web of activity. It was Einstein who first named the microscopic “bundles of energy” discovered by Max Planck “quanta,” and throughout the ensuing century new discoveries have spawned a whole new lexicon of terms to distinguish smaller and smaller, more and more dynamic subquantum phenomena. Since the splitting of the atom over sixty years ago, the smallest particle, graphically depicted as a tiny solar system with numberless electrons orbiting around its central nucleus, has undergone continual revision wherein each particle resembles an infinitesimal, hyperactive “system” whose protons and neutrons have been analyzed to distinguish at least twelve kinds of *quarks*. These in turn demanded new vocabulary to identify *neutrinos*, *muon-neutrinos*, *tau-neutrinos*, and eventually *anti-particles*.<sup>7</sup>

Moreover, experiments by quantum physicists have revealed that the behavior of everything perceptible to the senses is governed, not by immutable laws, but by constantly shifting relationships and interactions within and among all the occupants of the cosmos. Quantum physics stipulates a series of contrasts with classical physics (which prevailed from the seventeenth through the twentieth centuries).

- In contrast to the classical notion of a “higher cause” producing dependent “effects,” quantum theory postulates a web of mutually interdependent *interactions*.
- In contrast to the ultimately discoverable and reliable *laws* that classical physics promises, quantum physics offers *probability* in interactions and relationships at every level. By way of compensation for this risky *unreliability*, quantum physics offers the more attractive risk of *co-creativity*.

- In contrast to the classical image of a clockwork universe in which the whole is the sum of its discrete parts, quantum theory postulates a unifying gestalt: neither the whole universe nor anything in it can ever be reduced to its components any more than a human person can be reduced to body parts.
- In contrast to the strict hierarchy of being in the classical cosmos, a mutual interdependence of being blurs the distinction between “living” and non-living.

In summary, quantum theory advocates what Diarmuid O’Murchu calls “a quality of mystical receptivity” to the evolving nature of life at all levels, replacing the human struggle for dominance with “respect for life’s inherent processes.”<sup>8</sup>

Nothing in the above synopsis sounds really new, for the vision of quantum physics has gradually permeated the Western cultural mainstream in everything from ecology to religion to politics to literary theory. In a rudimentary way, most of us have been “speaking quantum” all our lives without knowing it. Hence one need not be a physicist nor understand the details of quantum theory to recognize its implications for contemporary Christian spirituality.

### *The Eye of the Blackbird: How Quantum Theory Helps Us to “See” God*

Science, like theology, offers a way to “see” God through metaphor. Quantum science offers a vivid image for the traditional church teaching that “God is everywhere,” as well as for our deepest personal intimations of a divine energy within and around us. A universe that is in motion in every atom of its being seems like a dazzling mirror for the God Aquinas defined as “Pure Act.” An invisible world moving so rapidly that it seems to stand still seems an apt metaphor for the philosopher’s “unmoved Mover,” to which T. S. Eliot added warmth and intimacy: “Love is itself unmoving/Only the cause and end of movement.”<sup>9</sup>

Quantum science also reminds us, however, that the God humanity once created in the image of classical physics, that is, a clockmaker who can be blamed for all defective parts and expected to repair every malfunction, can no longer be invoked by thoughtful Christians. Quantum science replaces this distorted image of God with one that becomes radically respectful of God’s freedom and our own.

Of course, science itself does not define the energy within and around the universe as divine, nor should we carelessly conflate scientific and theological terminology or unconsciously equate creation with the creator. Wessels, among theologians whose language about God is under continual revision in the light of modern science, nevertheless offers several important distinctions for us to keep in mind:

God and nature are not identical, but they are also not separable. . . . In an emerging universe . . . every being and every activity flows from the inner presence of God, and there is no way to separate the natural from the supernatural.<sup>10</sup>

. . . .  
Our loving God is clearly *other than* and infinitely *more than* the universe, but God is also inseparable from every being in the universe . . . . God is both immanent and transcendent simultaneously.”<sup>11</sup>

Here Wessels seems to agree with Aquinas, who subsumes immanence within transcendence: “Things are more in God than God is in things.”<sup>12</sup>

For Christians in particular, therefore, God is not a dualist: *everything is innately spiritual*. In the past this intuition of the mystics made them objects of suspicion for theological watchdogs on the alert for symptoms of pantheism. Now many theologians applaud the mystics for having anticipated our modern contempt for dualism, while physicists invent terms like “implicate and explicate order” to explain their claim that an entity or an event can be simultaneously “immanent” and “transcendent.”<sup>13</sup>

In our culture, intimations of an ambient spirituality are often brutally overwhelmed by the apparent triumph of materialism. For the most part, the task of articulating the *interiority* of matter that science affirms has been performed by poets. Jesuit poet Gerard Manley Hopkins died thirty years before Planck and Einstein published, yet poetic experience immersed him intuitively in the energetic inner life of nature that these scientific geniuses later described in physical terms. To Hopkins, whose world was “charged with the grandeur of God,”<sup>14</sup> every entity in nature was a revelatory and sacramental event, a glimpse into a hyperkinetic, inexhaustibly various mirror of the creator. Not only in human souls but also in the inner life of inert stones as well as soaring falcons, Hopkins recognized and celebrated *individuality* as a myriad expression of

the divine face. For the distinctive interior landscape of each physical phenomenon Hopkins coined the word “inscape.” Again and again, he struggled to translate into unique synaesthetic imagery the *instress* through which this inscape communicates itself. The opening octet of one of his famous sonnets fairly vibrates with quantum energy:

As kingfishers catch fire, dragonflies draw flame;  
As tumbled over rim in roundy wells  
Stones ring; like each tucked string tells, each hung bell's  
Bow swung finds tongue to fling out broad its name;  
Each mortal thing does one thing and the same  
Deals out that being indoors each one dwells;  
Selves—goes itself; myself it speaks and spells,  
Crying *What I do is me: for that I came.*<sup>15</sup>

In the concluding sextet Hopkins seems to spell out in the spiritual order what quantum physicists concluded after a long and strenuous debate about the behavior of the tiniest material phenomena, namely, that they are both particles and waves *simultaneously*. The ideal Christian, declares the poet, is in the same instant *autonomous* and *connected*. At the height of ecstatic autonomy, the poet finds himself at the center of the most profound *communion* and calls himself to responsible action:

I say more: the just man justices;  
Keeps grace that keeps all his goings graces;  
Acts in God's eyes what in God's eyes he is—  
Christ. For Christ plays in ten thousand places,  
Lovely in limbs, and lovely in eyes not his  
To the Father through the features of men's faces.

Hopkins' apprehension of the quantum universe that science had yet to discover forced him to invent unconventional prosody and syntax to convey a dynamism for which English grammar and metrics were too tame. Nevertheless, his spirituality is orthodox, and the demands of his eccentric style are less challenging than his clear theme: whenever we are profoundly present to the natural world, God is profoundly accessible to us. Together we operate from the center of an invisible energy that draws us simultaneously inward and outward, making us both autonomous and connected, both free and responsible, centered deep within

ourselves and a part of something bigger than ourselves, accountable to and for brothers and sisters—human and other-than-human—whom we shall never meet.

The paradox of autonomy and interdependence is further refined in the quantum physics of *holon theory*. Introduced by Arthur Koestler a quarter century ago,<sup>16</sup> holon theory postulates that whatever exists—in biology, cosmology, psychology, theology—represents both a whole and a part. Every whole forms a part of something bigger while not ceasing to be whole in itself. Once again, science is confirming a vision of reality that poets and mystics expressed long ago. William Blake’s version is often quoted:

To see a World in a grain of Sand  
And a Heaven in a Wild Flower,  
Hold Infinity in the palm of your hand  
And Eternity in an hour.<sup>17</sup>

Blake anticipates the quantum universe Brian Greene describes over a century later: “At the moment of the big bang, the whole of the universe erupted from a microscopic nugget whose size makes a grain of sand look colossal.”<sup>18</sup> This holon experience, intuited psychologically as “the self meeting the Self,” can be found in the literature of every religious tradition.<sup>19</sup>

When I read holon theory the first time, a shock of recognition brought back my most cherished memory, an incident I believe I can now call a holon experience. My older brother and I were out looking for wildflowers to place on our May altar at home. We crossed our favorite brook into a field of tall, sun-drenched weeds. Eventually we separated, and as dusk approached, I began to feel chilly. The weeds still retained some warmth, so I lay down in them and looked up into the sky. All at once the silence reached down and held me. God seemed to be simultaneously above, below, and within me, at once infinitely distant and intimately close, immense, yet focused to a pinpoint that was both myself and something more than myself. I have no idea how long this moment lasted, for time ceased until I felt my brother shaking me and calling my name.

The next day I hurried back to the field alone. I lay down in the weeds and waited, but nothing happened. I stood up and called out to the sky, “Hello God!” but no one answered. Then I noticed a little

hillock of violets nearby. Instinctively, I knelt and buried my face in them and whispered, “Hello God.” Then, for the first time in my life, I thought I knew where God wanted to be found: I hugged myself and murmured over and over into my own chest, “Hello God, Hello God!” The moment ended abruptly as I tasted the salt of strange tears. The God I addressed in that encounter had neither face nor form nor gender. The Presence bore no resemblance to anything in my imagination or vocabulary. I was nine years old.

Paul Tillich tells us: “One can never grasp the object of faith, but one can be grasped by it.”<sup>20</sup> In that childhood incident I was “held” by something I could never grasp, and that moment was and continues to be the quintessence of an “intimacy” for which all other uses of the word are inadequate metaphors. I believe almost everyone has episodes like this in which we are possessed and dispossessed by something we cannot define, deserve, or deny. Scientist David Bohm hints at this mystery in his attempt to define the holon experience: “a wholeness which is both immanent and transcendent, and which, in a religious context, is often given the name of God. The immanence means that what *is* is immanent in matter; the transcendence means that this wholeness is also beyond matter.”<sup>21</sup> Reflecting on holon theory can in itself open us to a momentary apprehension of the transcendent/immanent phenomenon Bohm describes.

Poetry concurs with science that “the numinous does not discriminate, . . . infinitude and oneness do not exclude anyone.”<sup>22</sup> The mystical poetry of Francis Thompson, for example, demonstrates that an intimate experience of God’s presence through creation is not reserved for “nice” people. An academic failure, an addict, and frequently a homeless person, the poet, not surprisingly, found a kindred spirit in the Book of Job, which Terrence Connolly suggests might be an unconscious inspiration for some lines:

But ask the animals, and they will teach you;  
the birds of the air, and they will tell you;  
ask the plants of the earth, and they will teach you;  
and the fish of the sea will declare to you” (Job 12:7-8).<sup>23</sup>

At once acknowledging and demolishing the traditional “hierarchy of being,” Thompson exhorts us to enter into communion with God through contemplation, not only of the stars but also of the souls of derelicts and of our own clay-shuttered psyches.

*The Kingdom of God*

O world invisible, we view thee,  
O world intangible, we touch thee,  
O world unknowable, we know thee  
Inapprehensible, we clutch thee!

Does the fish soar to find the ocean,  
The eagle plunge to find the air—  
That we ask of the stars in motion  
If they have rumor of thee there?

Not where the wheeling systems darken,  
And our benumbed conceiving soars!—  
The drift of pinions, would we hearken  
Beats at our own clay-shuttered doors.

The angels keep their ancient places;—  
Turn but a stone, and start a wing!  
'Tis ye, 'tis your estrangèd faces,  
That miss the many-splendoured thing.

But (when so sad thou canst not sadder)  
Cry;—and upon thy so sad loss  
Shall shine the traffic of Jacob's ladder  
Pitched twixt heaven and Charing Cross.

Yea, in the night, my Soul, my daughter,  
Cry,—clinging Heaven by the hems;  
And lo, Christ walking on the water  
Not of Gennesareth, but Thames!

*Francis Thompson*<sup>24</sup>

Among those for whom mystical experience reaches into silence, it is not surprising to find poets who “speak in the light of having experienced that which is now missing.”<sup>25</sup> Marion Goldstein's reflection on holon theory unconsciously continues that tradition.

*Holon*

The Physicist can not prove  
Every whole is  
Simultaneously  
A part  
And every part  
Is Simultaneously  
A whole  
In the ever-emerging  
Connectedness  
Of the universe  
There is always the absence  
Even when full  
A field  
Spilling yellow daffodils  
Beckons  
Lie in my golden arms  
A moment  
Whole  
But no, what's missing  
Is the absence  
Of more  
Always this yearning  
For what is hidden  
Like the black bird  
Deep in a bush  
You can not see  
Until it flies away  
You know  
Like God.

*Marion Goldstein*<sup>26</sup>

*Inflections and Innuendoes*

*How Quantum Physics Calls Us to Serve God*

Reflecting on the scientific theories outlined in this chapter should, first of all, energize us with encouragement that our smallest endeavors have global “relevance.” According to quantum physics, there is no such thing as a solitary inhabitant or an isolated activity in the universe. Just

as particles are also simultaneously waves reaching beyond themselves and interacting across great distances, so every holon has a capacity for self-transcendence that comes about by a combination of individual action and communion. As in human sexual union, the giving of the self engenders a new reality. At every level, therefore, nature preaches a call to fulfillment through transformation in another, a call heard in simpler language in John's Gospel: "Unless a grain of wheat falls into the earth and dies, it remains just a single grain; but if it dies, it bears much fruit" (John 12:24).

In many ways quantum reality mirrors the way the life of a contemplative individual affects the whole world. His or her level of consciousness and level of charity are nodes of spiritual energy simultaneously *autonomous* and invisibly yet powerfully *connected* to the whole body of the world by way of self-transcendence. Meditating on holon movement can also call us to the interactive dimension of Eucharist. Holon theory makes us see that the sacrament of Holy Communion, once considered an intensely private act, reaches fulfillment in the commitment to *give* as well as *receive* Holy Communion. For centuries Christians have known the invisible drama of giving and receiving spiritual energy as the Communion of Saints.<sup>27</sup> Quantum physics extends the concept by calling us to a global holonomy as a form of ecumenical worship. Worship, ideally, calls the worshiper to resist competitive consumerism, for holonomy with the planet and the universe sings a hymnody more pleasing to God than an anthropocentric chorus of soloists.

Like the written Scriptures, scientific data yield life-altering insights only after long and prayerful attention in the light of holistic experience. When one meditates faithfully on these parallel texts, when one opens a scientific text or news item with the prayer "Speak Lord, your servant is listening" (1 Sam 3:10), by degrees one begins to recognize "the divine in what is not divine"<sup>28</sup> and to replace dead metaphors with live ones. Gradually the quantum universe emits energetic hints at the mysterious life of the Trinity, in what one ecotheologian describes as "a mystery of engaged living, a loving, personal communion that erupts eternally within God's own being and explodes into a fragmented universe (at least one), fraught with the force of God's own exuberance."<sup>29</sup> Such imagery will prove more soul-satisfying than pictures of an old man, a young man, and a bird. At the practical level, we can hope that this exchange of metaphors will cleanse our faith and deepen its level of engagement. Meditating on quantum physics should propel us, once

and for all, out of the devout and self-deceptive posture that waits in a broken world calling on omnipotence to “come down” and “fix it.”

Since poets’ intuitions frequently predate the discoveries of science, a “new discovery” often resembles poetry written long ago. For example, the following poem juxtaposes a news article published in 2004 with lines written before the “new” scientists were born.

### *Supersolid*

T. S. Eliot, you old plagiarist!  
Outdone yourself at last—  
stolen the words  
right out of the mouth  
of the future.

*At the still point of the turning world,  
Neither flesh nor fleshless,  
a white light, still and moving.  
At the still point there is only the dance.*<sup>30</sup>

Three quarters of a century later  
quantum midwives cry:

*The whole system is undergoing  
a coordinated movement like a ballet dance.  
Helium spinning at white heat  
gives birth to a freezing supersolid.*

*Neither gas nor fluid  
a new state of being!  
“It’s going to make us rethink  
our whole concept of ‘solid.’”<sup>31</sup>*

But you were there first, old friend,  
burning in the dry ice of faith  
freezing one half degree above  
absolute zero  
spinning toward the still point  
where your partner disappears  
into the dance, the only solid  
solid in our fragile universe.

*Elizabeth Michael Boyle, O.P.*

## NOTES

<sup>1</sup> Freidrich Schelling, “Ideas for a Philosophy of Nature,” cited in Lynn Gamwell, *Exploring the Invisible: Art, Science, and the Spiritual* (Princeton: Princeton University Press, 2000) 13.

<sup>2</sup> Letter to a child who asked if scientists pray (24 January 1936), Einstein Archive 42-601.

<sup>3</sup> Tom Mahon, “The Spirit in Technology,” cited in Michael Reagan, ed., *The Hand of God: Thoughts and Images Reflecting the Spirit of the Universe* (Philadelphia: Templeton Foundation Press, 1999) 139.

<sup>4</sup> Ernesto Cardenal, *Cosmic Canticle*, trans. John Lyon (Williamantic, CT: Curbstone Press, 1993).

<sup>5</sup> For example, Mary Catherine Hilbert, O.P., *Imago Dei: Does the Symbol Have a Future?* Santa Clara Lectures, vol. 8, no. 3 (Santa Clara University, 14 April 2002); Denis Edwards, “For Your Immortal Spirit Is in All Things: The Role of the Spirit in Creation,” in *Earth Revealing—Earth Healing: Ecology and Christian Theology*, ed. Denis Edwards (Collegeville, MN: Liturgical Press, 2001) 45–61.

<sup>6</sup> Hildegard of Bingen, “Antiphon for Divine Wisdom,” in *Symphonia: A Critical Edition of the Symphonie Aemonie Celestium Revelationum*, trans. Barbara Newman (Ithaca: Cornell University Press, 1988).

<sup>7</sup> Brian Greene, *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory* (New York: W. W. Norton and Company, 1999) 7.

<sup>8</sup> Diarmuid O’Murchu, “What Is the Quantum All About?” in *Quantum Theology: Spiritual Implications of the New Physics* (New York: Crossroad, 2003) 23–35.

<sup>9</sup> T. S. Eliot, “Burnt Norton,” in *The Complete Poems and Plays* (New York: Harcourt, Brace and Company, 1952).

<sup>10</sup> Cletus Wessels, *Jesus in the New Universe Story* (Maryknoll, NY: Orbis Books, 2003) 33.

<sup>11</sup> *Ibid.*, 58.

<sup>12</sup> Joseph Pieper, *The Human Wisdom of Saint Thomas: A Breviary of Philosophy from the Works of Saint Thomas Aquinas*, trans. Drostan MacLaren (New York: Sheed and Ward, 1948) 87.

<sup>13</sup> David Bohm, *Wholeness and Implicate Order* (New York: Routledge and Kegan Paul, 1980).

<sup>14</sup> “God’s Grandeur,” in *Hopkins: Poems and Prose*, Everyman’s Library Pocket Poets (New York: Alfred A. Knopf, 1995).

<sup>15</sup> *Ibid.* “As Kingfishers Catch Fire.”

<sup>16</sup> Arthur Koestler, *Janus* (London: Hutchinson, 1978).

<sup>17</sup> William Blake, “Auguries of Innocence,” *The William Blake Archive*, ed. Morris Eaves, Robert N. Essick, and Joseph Viscomi (4 November 2005): <http://www.blakearchive.org>.

<sup>18</sup> Greene, *Elegant Universe*, 4.

<sup>19</sup> Jane Hirshfield, *Women in Praise of the Sacred: 43 Centuries of Spiritual Poetry by Women* (New York: HarperCollins, 1994) xix.

<sup>20</sup> Paul Tillich, *Shaking the Foundations* (New York: Charles Scribner’s Sons, 1996) 27.

<sup>21</sup> “A Conversation with David Bohm,” *The Holographic Paradigm and Other Paradoxes*, ed. Ken Wilber (New York: The New Science Library, 1982) 187–188.

<sup>22</sup> Hirshfield, *Women in Praise of the Sacred*, xix.

<sup>23</sup> *Poems of Francis Thompson*, ed. Rev. Terrence L. Connolly, S.J. (New York: D. Appleton Century, 1941) 555, nn. 5–6.

<sup>24</sup> Published in 1908 under the title “In No Strange Land,” with the subtitle “The kingdom of God is within you,” 554, n. 1.

<sup>25</sup> Hirshfield, *Women in Praise of the Sacred*, xx.

<sup>26</sup> Marion Goldstein’s use of scientific metaphor for spiritual realities inspired her award-winning chapbook *Psalms for the Cosmos* (Johnstown, OH: Pudding House Publications, 2003).

<sup>27</sup> Wessels, *Jesus in the New Universe Story*, 51.

<sup>28</sup> Edwards, “For Your Immortal Spirit Is in All Things,” 61.

<sup>29</sup> Anthony Loewes, “Up Close and Personal: In the End, Matter Matters,” in *Earth Revealing—Earth Healing*, 133.

<sup>30</sup> Fragments from “Burnt Norton,” in *The Complete Poems and Plays* (New York: Harcourt, Brace and Company, 1952).

<sup>31</sup> “Only in Quantum Physics: Spinning While Standing Still,” *New York Times* (21 September 2004) F3.