Teilhard and Hawking on Creation

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ABSTRACT

Assuming its validity, Stephen Hawking uses M-theory, a variant of the still-controversial Superstring theory, to present a rather impressive cosmological finding: the universe had no beginning. He then extrapolates this result into the theological realm to claim that, because the universe had no beginning, there is no longer any need for God. In what follows, I question the appropriateness of Hawking's theological claim and compare his approach to that of Jesuit paleontologist Pierre Teilhard de Chardin who views creation not as a one-time event that happened at a single point in space-time but instead as a cosmic becoming. Rather than attempting to set up a proof for God's existence or non-existence, Teilhard reflects on the theory of evolution and demonstrates that belief in a personal God is still consistent with the findings of modern science, whether or not Hawking's claim that the universe had no beginning can eventually be verified.

INTRODUCTION

I met Stephen Hawking only once. On that fall afternoon in the 1980s, he was carried in his wheelchair onto the stage of Drexel University's Disque Hall where he was scheduled to lecture on baby black holes. After being warmly welcomed by the audience, he began mumbling his talk, sentence by sentence, to his graduate student, who then conveyed the content to the audience. At that time, he was already beginning to suffer quite severely from ALS (amyotrophic lateral sclerosis), but was not yet using a voice synthesizer and could still be understood by those close by. During a coffee break in the physics lounge after the lecture, I was impressed with a person who not only could socialize so freely and perform complex computations without the aid of computer, calculator, or even pencil and paper, but who, despite a major physical difficulty, was determined to complete a work that seemed crucial.

As a scientist, I applaud those who, like Stephen Hawking, have been trying to realize Einstein's dream—to discover what has been called the Theory of Everything (TOE), a theory that will presumably unite quantum mechanics with general relativity—the small scale with the large. One of the latest competitors in this arena, and one that Hawking espoused, is Superstring theory, a theory that maintains that every particle we have been calling elementary is actually composed of an infinitesimal string whose vibrational pattern is responsible for the particle's unique character. These strings are in constant motion, presenting a dynamic picture of the cosmos at its very core. However, as fascinating as it sounds, Superstring theory has one serious drawback. It is difficult to find experimental tests for a theory that manifests itself at orders of magnitude so much smaller than the atom. At this moment, then, Superstring theory seems quite far from universal acceptance by the physics community.

One of Stephen Hawking's many research interests concerns the beginning of time, and specifically whether there was in fact a beginning. Although the Big Bang theory provides information about the evolution of the cosmos very close to the beginning of time, the presence of a singularity at the beginning has made it impossible to say anything about its physical beginning. In an attempt to overcome this barrier, Hawking used M-theory and several approximations to remove all singularities and set up some boundary-like conditions that allowed him to do the necessary calculations. His No-Boundary Proposal indicates that the universe had no beginning. In fact, our universe seems to be one small 4-dimensional bubble in a multiverse containing many other universes.

Although this result is interesting and may in fact be the case, several steps in Hawking's process suggest caution. Among these is the fact that Superstring theory, the theory on which No-Boundary Proposal is based, is still not tested. In addition, Hawking made approximations and imposed boundary-like conditions to allow him to perform the necessary calculations. Although science often uses approximations that simplify calculations to great advantage, at times approximations can produce misleading results. One is reminded of how, when computers finally made it possible for physicists to solve nonlinear equations without reducing them to approximate linear ones, our understanding of the physical world changed immensely—the new field of complexity science emerged with powerful new ways of looking at nonlinear dynamics.

Hawking's definitive claim about the physical properties of the universe based on an untested physical theory is already questionable. Yet even more alarming is his use of this untested result from physics to decide a theological question. He asserts in addition that since there is no beginning and because the force of gravity is powerful enough to produce the material universe, there is no longer any need for God. Basing this conclusion on a scientific finding is a clear example of scientism, the belief that science is the only reliable road to truth, the mistaken attempt to use physical theories to answer questions that are religious in nature. Moreover, Hawking's use of a somewhat outmoded idea of creation is an example of Biblical literalism. So, while Hawking employs the most up-to-date theories from physics to conclude that the universe had no beginning, he attempts, at the same time, to debunk an outdated image of God, a God whom he describes in anthropomorphic terms, a God who is clearly too small for the cosmos we know today. Deciding whether God exists based on purely physical mechanisms is to reduce God to a mechanic. It is not surprising then that this God is unnecessary. Of course, new data about physical aspects of the early universe can enhance theology's understanding of creation, and dialogue in this area should be strongly encouraged. However, the encounter should be between theories of the finest quality in both areas, whether tested or untested.

Therefore, instead of relying on Hawking's approach to this particular question about God and creation, I suggest an alternative approach, one devised by French Jesuit geologist and paleontologist Pierre Teilhard de Chardin. While Teilhard was still a young seminarian, the Catholic Church was opposing the theory of evolution based on outdated theological considerations. And, like the Church's resistance to Galileo and to the heliocentric view of the solar system many centuries before, this resistance to evolution exemplifies an improper use of theology to make a statement that is the purview of science. Teilhard, on the other hand, sensed that evolution is not only compatible with a religious perspective, but that a deeper understanding of evolution could actually enhance our

understanding of God and the cosmos. To unpack this, he worked for many years on a faith statement that would demonstrate their compatibility.

For Teilhard the geologist and paleontologist, evolution was written large in the rock and fossils that he encountered in his fieldwork. Literal interpretations of the stories of creation, the Garden of Eden, and original sin found in the first couple of chapters of the book of Genesis have implications for the Christian doctrines of Creation, Incarnation, and Redemption that no longer fit with his scientific experience of the theory of evolution. Teilhard knew that he could not lead an integrated life if his faith and his science were at odds. He also regretted the damage done to the faith of others, especially those engaged in science. For this reason, he decided to try to resolve the conflict by developing a personal faith statement that might eventually be helpful to others. The result of this exploration gave him access to a more powerful image of God and a more integrated spirituality.

COMPOSING A FAITH STATEMENT

Although many think of faith as no more than an assent to a list of Christian dogmas, (DM, 134), for Teilhard, faith is much more than that. He asserts: "*To believe is to effect an intellectual synthesis,*" (CE, 98), to engage in "*the supreme spiritual act by which the dust of experiment takes form and life in the fire of knowledge*" (V, 205). This implies that although the believer's faith must be firm, it must also be flexible enough to incorporate our evolving understanding of the physical world, a practice not common in Teilhard's day. Yet today, when scientific breakthroughs happen often, integrating them into our theology and spirituality requires continual reflection and constant effort. Devising a personal faith statement helped Teilhard deal with the barriers that the Church had erected between evolution and theology.

Teilhard characterizes a faith statement as "*a positively constructed whole in which the parts support and complement one another ever more effectively*" (T, 165), without ever producing internal contradiction. Teilhard's process of creating a faith statement is similar to the process scientists use when developing a scientific theory. They slowly and systematically gather data, formulate a scientific hypothesis, test it to see whether it is robust enough to be considered a theory, and finally share their results with the rest of the scientific community for feedback and further verification. Similarly, when creating a faith statement, Teilhard gathers the data of his total life experience, both scientific and spiritual, and attempts to integrate it into a single whole. A coherent faith statement is one in which the data of experience hold together.

Just as scientists must stay attentive to future experiments and welcome new data that might contradict a current scientific theory, a person of faith must stay ever attentive to life to see whether experience continues to support the original statement. A faith statement must always be open to revision; new data that bring new insights are always welcome and tend to enhance the original. This life-long activity kept Teilhard's faith alive and charged with trust in God's beneficent strength (D, 134). His long and deep personal struggle kept his faith ever new, even as it was firmly grounded in scripture and tradition.

Teilhard was determined to work through the contradictions that evolution was posing to the Church's interpretation of Creation, Incarnation, and Redemption. He refused to be satisfied until his faith statement fit with his total experience. In fact, he claims the process took him about thirty

years. He considered his faith statement somewhat complete only when, after considerable struggle, he was able to weave together into a coherent network his total human experience—both his scientific knowledge of the cosmos and the strands of wisdom found in his faith tradition. Not until he was able to effect such a synthesis, not until his data fit together comfortably, did he feel ready to say, with all his heart, with all his mind, with his whole being: "I believe."

TEILHARD'S PROCESS

To compose and test his faith statement, Teilhard uses two different approaches. In the first, he considers his experience of the physical world, his experience of the physical evolution of matter, a phenomenon that is starkly apparent to the eye of a geologist/paleontologist. Next, he incorporates his spiritual experience along with its implications, and only gradually is he able to deal with the dogmas of faith that seemed to some contrary to the theory of evolution. Having finally developed a faith statement, Teilhard reverses the process. In this second approach, he plumbs more deeply his emerging understanding of God and tests it against the tradition. The statement that he develops does not attempt to prove God's existence or to present a final description of reality, but rather it attempts to integrate his personal inner and outer experiences of the world into a coherent whole.

Phase I

Teilhard is convinced that supernatural faith builds on natural faith, which he describes as "any adherence of our intelligence to a general view of the Universe" (CE, 98). Therefore, in the first phase of his process, he abandons, to the best of his ability, all theological assumptions about reality so that he can discover the truth that lies in the depths of his heart. To arrive at his primary belief, he sets out on an imaginative journey toward the beginning of time, hoping to explore the evolutionary story of the universe told by science, focusing in this phase on matter's purely physical makeup.

He begins by gathering data. As a geologist working in both the field and the laboratory, he had learned much about the evolutionary process. But now he wants to contemplate the process more fully, to come to a richer understanding of its dynamics. He descends toward the deepest part of himself and of the universe to determine his true convictions, to discover his core belief, a belief to which he could truly commit himself no matter what. In his major opus, *The Human Phenomenon*, he recounts his imaginary journey back through the lengths and depths of space-time, back through the strata of rock and soil that hold the secrets of Earth's past, back before the Solar System ever existed, back before the stars and galaxies were formed.

As he travels into the distant past, he notes how, in reverse chemical and physical reactions, matter reverts to simpler forms, things fall apart, and disintegrate into component fragments. Finally, as he nears the beginning, he comes to a standstill as he finds himself immersed in a sea of elementary particles. Disappointed that the unity he is seeking is not found at the beginning, he reverses his direction and journeys back through space-time toward the present. As he does, he experiences once disparate matter becoming gradually more complex and notices how more complex entities come into being through a process of union. He watches elements as they interact with one another, fall apart only to come together to form new entities. Elementary particles fuse into elements that are more complex: protons and neutrons unite to form nuclei, nuclei unite with electrons to form atoms, atoms form molecules. As matter becomes more dense, gravity attracts the cosmic gas and dust and,

after millions of years, galaxies and stars form in our ever expanding universe. Billions of years later star systems with Earth-like planets begin to come alive and prepare for the coming of life.

After much violent activity, the first hint of life appears on Earth—the first cells emerge from the union of molecules. As cells develop more intricate structures, they divide, interact, and reproduce sexually. Life continues to branch into a myriad of species of both plants and animals, ever more developed as this process continues. The variety seems limitless. Diversity continues to increase; novel forms continue to arise.

As Teilhard proceeds on his journey through space-time, he notices a pattern that he calls Creative Union and describes it in this way: whenever two or more entities interact and unite, without losing their identity, they become something new, more than they could have been alone. The complex emerges from the union of simpler structures. Creative Union is an empirical and pragmatic explanation of how the universe is coming into being (S, 44). Despite the many dead ends and roadblocks it faces along the way, it seems directed toward union, constant differentiation, and continual production of novel forms. Teilhard becomes convinced that matter will continue to complexify with time. He has found the basis for his natural faith, the general worldview that is to become the touchstone for his faith statement. He expresses his fundamental intuition in this way: *"I believe that the universe is an evolution"* (CE, 96).

Phase II

As Teilhard embarks on the second phase of his faith journey by retracing his steps through space-time and engaging in a contemplative process. This time he is aware that he had been so focused on the physical side of matter that he was unaware of the "within" of things. He had ignored matter's spiritual or conscious component. Once he recognizes his omission, he sees the emptiness of the materialist illusion, the belief that all reality is purely physical and measurable. Now, he experiences matter as suffused with an inner life and notices how consciousness increases in proportion to its physical capacity for complexity. While studying animal fossils, he noted evidence of this progression. An animal's capacity for more conscious activity is somewhat correlated with the increased complexity of its brain. This encourages him to assert that every form of matter—whether stones, or trees, or people—contains a certain level of consciousness and that, like matter's physical component, spirit has evolved from an elementary form present at the beginning. Clearly then, these evolutionary processes are inseparable—spirit has somehow evolved in parallel with physical matter and has emerged as reflective consciousness in the human species.

The growth of freedom and interiority that Teilhard witnessed during his forward journey through space-time confirms a pattern found everywhere in the cosmos. He formulates this cosmic insight into the law of Complexity-Consciousness. This law states that, on one hand, as matter becomes more complex, it becomes capable of generating and sustaining more developed forms of consciousness or spirit; and, on the other hand, as spirit or consciousness increases, it encourages the further complexification of matter. The laws of Complexity/Consciousness and of Creative Union, which were so apparent to him in the workings of the cosmos, provide a mechanism for the ongoing creative process. Separately, the evolution of matter and the evolution of spirit fail to give satisfactory accounts of life's meaning. Meaning emerges only from their synthesis.

As Teilhard allows the results of the first two phases of his process to interact, he experiences surprising insights. The universe is in process, directed towards union. Spirit is alive, evolving, and actually guiding the forward movement of the cosmos. Thus, he is able to conclude: "*I believe that evolution proceeds towards spirit*" (CE, 96).

Phase III

In the third phase of his effort to compose a faith statement, Teilhard extrapolates the laws of Creative Union and Complexity-Consciousness into the future, hoping to learn more about the centering process in which the universe is involved. In the human species, the spiritual component of matter has become reflective and life has become personal, and in the process, a new personal force of attraction, the force of love, supplements the fundamental physical forces of gravity and electromagnetism. It seems reasonable then that humanity will continue to move toward ever-greater consciousness and that the cosmos will continue to converge toward what Teilhard calls the "hyperpersonal" (HP, 184). Therefore, Teilhard concludes: *"I believe that spirit is fully realized in a form of personality"* (CE, 96).

Phase IV

In the fourth phase, Teilhard explores supernatural faith, that is, faith in the Christian mysteries. Given the experience of his space-time journey, he feels confident enough to consider interpretations of Creation, Incarnation, and Redemption more in tune with the science of his day. As interpreted by Church's officials of his day, these dogmas seemed to clash with the theory of evolution and posed serious difficulty for him and for many of those who were taking the theory of evolution seriously (T, 207). Once the evolutionary nature of the universe and of life on Earth becomes clear, static interpretations of these mysteries are no longer helpful. In a static world, Redemption is often pictured as a return to an ideal Eden, an image that can hardly be taken literally in an evolutionary world. Also, monogenism, which states that the human race began with a single set of parents at one particular moment in time, is no longer biologically sound. Finally, Incarnation usually focused on the life, death, and resurrection of Jesus without regard for its impact on the rest of humanity, much less the rest of the cosmos. On the other hand, Teilhard finds that evolution provides the Christian message with greater power and beauty, imparts greater dignity to human labor, and encourages responsibility for the future.

Encouraged by his assurance that the universe will converge toward the personal or more precisely toward deeper consciousness, Teilhard proceeds with the final phase of his process. His goal is a holistic religious worldview (CE, 99). He hopes to integrate the Christian mysteries of Creation, Incarnation, and Redemption with his natural faith in evolution, without forcing either. To do this, he allows these "*two apparently conflicting influences [in this case, evolution and Incarnation] full freedom to react upon one another*" within his deepest self (CE, 97).

The data that Teilhard amasses for this final phase consist of some twelve to fifteen scripture passages from Paul and John that are remarkably cosmic. Reading these passages through a cosmic lens and against the backdrop of an evolutionary world provides both dramatic and synthetic power for the concept of the Word of God made flesh and lends support to human endeavor. John speaks of Christ as "the Alpha and the Omega, the Beginning and the End" (Rev 21:6). Paul's description places Christ at work at the "head of every principality and power" (Col 2:10), up ahead in the future

encouraging creation to overcome evil, drawing all into one. The Christian mysteries suddenly come alive. They are cosmic and dynamic—no longer happening at solitary points in space-time.

In a dynamic world, one that is both evolutionary and Incarnational, Christ assumes an evolutionary role. As the Omega Point of creation, "*Christ, [in whom all things hold together], is capable of animating and guiding . . . the universe*" (S, 117). And these two powerful currents (evolution and Incarnation) converge to form "*a synthesis of Christ and the universe*" (CE, 126), a single Cosmic-Christic stream that runs through space-time. The Cosmic Christ is the supreme Center to which all things are attracted, the One who unites all, draws all into union.

As the cosmos continues to evolve, all is becoming one in Christ. This implies that Christ too is in a process of formation, a process that will be consummated only at the end of time when "*what is best in [each of us] should pass, there to remain forever, into one who is greater and finer than [ourselves]"* (CE, 115). It is in the Cosmic Christ "*that we shall inevitably find ourselves personally immortalized*" (CE 116).

To help fulfill the promise of evolution, the Cosmic Christ allures humanity into action on behalf of this final goal. In fact, humanity's conscious participation in the forward movement of the cosmos is central. The world can be saved only if humanity accepts its responsibility and each person "*can be saved only by becoming one with the universe*" (CE, 128). Thus, faith in the world becomes faith in the Cosmic Christ and, in turn, faith in Christ becomes faith in the world. When Teilhard allows the data that he amassed from his cosmic journey to speak to the data from his faith tradition, he finds that the two perspectives do hold together, that the cosmic-Christic stream comes into sharp focus and that the cosmos does have a direction.

Having checked his hypothesis against the data of his experience, Teilhard becomes convinced "*that the world, taken as a whole, is assured . . . of arriving at a certain higher degree of consciousness*" (S, 41). He feels confident that the universe is capable of continuing this process, that humanity will continue its evolutionary groping toward fuller life and will culminate in spirit, and that spirit will live forever. In conclusion, he declares: "*The universe,* as a whole*, cannot ever be brought to a halt or turn back in the movement which draws it towards a greater freedom and consciousness . . . 'ahead of us there must lie something that is immortal'*" (CE, 109-10).

Christ holds all things together and humanity is invited to build the Earth in collaboration with the Cosmic Christ. Evidence that the universe has been successful in its attempts at creating ever more novel and complex wholes assures Teilhard that it is guided by a power who is in control of the elements. Teilhard's original "*vague intuition of universal unity has [finally] become a rational and well-defined awareness of a presence*" (CE, 117). On this final phase of his faith journey, Teilhard concludes: *"I believe that the supremely personal is the universal Christ"* (CE, 96).

Teilhard's synthesis is complete. He concludes his process with the following faith statement that rings true to his experience and will be the vision that drives all of his activity in the world:

> *I believe that the universe is an evolution.*
> *I believe that evolution proceeds towards spirit.*

I believe that spirit is fully realized in a form of personality.
I believe that the supremely personal is the universal Christ. (CE, 96)

THEOLOGICAL CONNECTION

To verify that the cosmic qualities he is projecting onto Christ can be reconciled with Christian theology (T, 192), Teilhard searches for an image of God that is at least as dynamic as the theory of evolution. Although he rarely mentions the Trinity in his writings, Teilhard always understood God as Triune. However, by 1948, the image of a Trinitarian God who exists by uniting and who encourages creation to become more through a process of union seemed most appropriate for his synthesis. Its connection with Creative Union, the physical driving force of the cosmos, is key. Creative Union becomes the cosmic counterpart to the unification process that pervades the Trinity's inner life. It reflects the dynamic flow of unioning love within the Trinity (T, 196) and provides a glimpse into the inner life of God who exists by relating. The complexity that results from the process of Creative Union reflects creation's response to God's desire for ever-greater wholeness (T, 195).

Given the role that union plays in the life of the Trinity, Incarnation, God's presence within the creation that stimulates the cosmic becoming, seems almost inevitable. It is God's natural response to a cosmos in great need of union, the response of a God who brings creation into being and sustains it through a process of union, a God who continues to create by uniting (T, 196). The image of God as Trinity then becomes an archetype of Creative Union, the unification process of the cosmos.

Because Teilhard synthesizes the two most profound movements at work in the cosmic becoming, his notion of a God for evolution is more profound than the image of a static God. His God is a God who creates by uniting (T, 196). Instead, God as Trinity is a process and evolution is the outward expression of the God-life, a gradual revelation of God's creative power that expresses itself within a process of cosmic becoming. It becomes clear to Teilhard that the creative process can no longer be limited to a single point in space-time.

Teilhard's faith is rich and alive. By allowing his understanding of the evolutionary process to influence his theology, he has been able to formulate a faith statement that confirms both his scientific experience and his theological beliefs without demystifying his theology or denying the conclusions of his science. His laws of Creative Union and Complexity-Consciousness give insight into the action of the Cosmic Christ who allures and guides the cosmic becoming.

THE SHADOWS OF FAITH

Despite Teilhard's deep faith in the Cosmic-Christic stream in which he found himself embedded, he was not exempt from doubt. In fact, he was sometimes plagued with uncertainty and with suggestions that he might be mistaken. He says, "*I feel no special assurance of the existence of Christ. Believing is not seeing. As much as anyone, I imagine, I walk in the shadows of faith*" (CE, 131). So few seemed to see what he was able to see. Certainly, the rejection of his thought by Church authorities weighed heavily on him. What pained him deeply was the thought that, if he were mistaken, his significant human effort might be in vain, that its fruits might be lost.

Yet, whenever "*the shadows of faith*" (CE, 131) did overtake him, he was encouraged by the coherence of his synthesis, a synthesis that allowed him to focus his love for the world and his love for God in a single direction and gave his spirituality a sense of integrity. Also, the image of a dynamic God, capable of exerting synthetic power seemed to him far superior to the image of a static God (HM 100-1).

And despite the deep mists that sometimes blurred his horizon, Teilhard was convinced that a life lived in faith is far superior to its opposite. Faith gave his life a sense of meaning and purpose. He contrasts faith with its lack:

> *If we do not believe, the waves engulf us, the winds blow, nourishment fails, sickness lays us low or kills us, the divine power is impotent or remote. If, on the other hand, we believe, the waters are welcoming and sweet, the bread is multiplied, our eyes open, the dead rise again, the power of God is, as it were, drawn from him by force and spreads throughout all nature.* (DM, 135)

Teilhard has dared to plunge into the unknown, to risk the security of his childhood faith, to allow himself to doubt all that had previously supported his spiritual life, so that he could be free enough to experience his depths. As he reverses his direction from overconfidence in dogmas, he finds that integrating Christ into the dynamics of the Universe makes his faith not only reasonable but also fully alive and truly vibrant.

CHRIST AND RELIGIONS-IN-THE-WORLD

In spite of his focus on Christian doctrine, his naming Christ as the Center of creation, and the great value he placed of Christianity's belief in the immortality of spirit and in a personal God, Teilhard acknowledges that Christianity could learn much from other great traditions. In his essay "Creation and Evolution," he mentions two aspects underappreciated in the Christian tradition of his day. Living in China, he found the traditions of East Asia (Confucianism, Daoism, and Buddhism) much more in tune with a cosmic sense. In addition, his many discussions with his friend Ida Treat made him aware of the importance of work in the world that was missing in his experience of church teaching. Teilhard envisions what is best in these and other traditions as rivers that will begin to draw together in a process based on his law of Creative Union. He articulates his hope for the religions of the future: "*A general convergence of religions upon a universal Center who fundamentally satisfies them all: that seems to me the only possible conversion of the world, and the only form in which a religion of the future can be conceived*" (CE, 130).

CONCLUDING COMMENTS ON TEILHARD AND HAWKING

Had he lived long enough, Teilhard would have loved to learn more from Hawking about superstring theory and black holes. Unfortunately, Teilhard died while Hawking was still a child. Already so aware of the beauty and the vastness of the cosmos, he would have been further awestruck by the possibility of an ever more vast multiverse. The image of strings vibrating at the heart of matter would serve as a moving image for the mechanism of resonance between himself and matter as well as the resonance he experienced between himself and God, between himself and other persons. Certainly, a world where the elementary physical substance of all things is composed of vibrating

strings charged with energy would have fit his experience of the inner life of the cosmos. These topics would have been points of convergence for any conversation they could have had.

However, because in dealing with the subject of creation, Teilhard and Hawking approach the question in very different ways, they would have had difficulty coming to a common understanding. Both scientists begin by attempting to gain greater understanding of the physical world by traveling to the beginning of time. Teilhard uses data from biology and physics and relies on models of evolution and experience in the field, while Hawking relies on equations and models from the latest theories of physics. Yet, while Teilhard struggles to incorporate both the inner and outer life of the world into his synthesis and arrives at a profound understanding of the cosmic becoming, Hawking deals with matter's physical side alone and ignores the inner life of physical reality. And while Hawking focuses his attention on a single moment, the first moment within an extremely long cosmic process, Teilhard is conscious of an ongoing, dynamic, and creative process.

Hawking and Teilhard describe creation with very different theologies. Hawking considers creation a one-time event caused by a God he describes in overly anthropomorphic terms, a God who has one and only one function—to light the fire of creation, to start the universal expansion, to begin the process of cosmic becoming, and then to disappear. The result of his research: "*So long as the universe had a beginning, we could suppose it had a creator. But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be. What place, then, for a creator*?" (Stephen Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (New York: Bantam Books, 1990), 140-41).

Teilhard, on the other hand, is not so interested in whether there is a beginning. His theology and his faith do not depend on a single creative act. Instead, he considers creation as an ongoing process, a cosmic becoming, which exhibits itself as an evolution. By struggling with the complexity of life and acknowledging the inner life of the world, Teilhard comes to know the person of Christ in a deep way. His God is a God of great power, of tender compassion, and of deep love. His understanding of Incarnation allows him to see Christ everywhere, in the Eucharist, in the hearts of those he loves, in the future of the cosmos, and at the very heart of matter. His experience of Christ's presence in all things gives him the courage he needs to face the difficulties of his life.

Therefore, Hawking and Teilhard arrive at radically different conclusions. Motivated by his faith in science's power finally to demystify nature, Stephen Hawking strives to develop a Theory of Everything that would explain all there is. However, his scientism, which tends to understand by explaining away, actually flattens his understanding of the cosmos. The inscription on his tombstone, "Here lies what was mortal of Stephen Hawking," with its focus on his material remains, suggests that he lacks a sense of mystery. However, near the end of his popular work *A Brief History of Time*, he does make a very important point. He says: "*Even if there is only one possible unified theory, it is just a set of rules and equations."* He continues by asking an even more insightful question: "*What is it that breathes fire into the equations and makes a universe for them to describe?"* (Hawking, *A Brief History*, 174).

Teilhard, on the other hand, allows his experience of the scientific theory of evolution to enhance the mystery of the cosmic becoming, to reveal an ever-greater God. Although his grave is devoid of any

reference to his amazing synthesis, he has become immortalized in a well-known quotation: "*The day will come when, after harnessing . . . the winds, the tides, gravitation, we shall harness for God the energies of love. And, on that day, for the second time in the history of the world, we will have discovered fire*" (T, 86-87). Teilhard has successfully imbued the theory of evolution, the physical manifestation of cosmic becoming, with the Fire of the Cosmic Christ.

Abbreviations for Works of Pierre Teilhard de Chardin

CE *Christianity and Evolution* New York: Harcourt Brace Jovanovich, Inc., 1969.

DM *The Divine Milieu*, Bernard Wall, trans. New York: Harper & Row, Publishers, 1960.

HM *The Heart of Matter*, René Hague, trans. New York: Harcourt Brace Jovanovich, Inc., 1978.

HP *The Human Phenomenon*, Sara Appleton-Weber, trans. Portland, OR: Sussex Academic Press, 1999.

S *Science and Christ*, René Hague, trans. New York: Harcourt Brace Jovanovich, Inc., 1968.

V *The Vision of the Past*, J. M. Cohen, trans. New York: Harper & Row, Publishers, 1966.

T *Toward the Future*, René Hague, trans. New York: Harcourt Brace Jovanovich, Inc., 1975.