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Editorial

STRUGGLING OVER NATURE

Nature stands at the very center of an intense struggle today. We witness it in passionate controversy over basic questions. How urgent is it that we care for the natural environment? How should we care for it? Should embryos, even those that are surplus products of fertility therapy, be treated as if they were human beings? How many nonhuman animals, rhesus monkeys, for example, can be destroyed in testing that aims at benefits for humans? Where do we draw the line between therapy and enhancement in our genetic engineering? What limits, of any, should be set for stem-cell research? How do we set priorities for balancing medical research and care that aims at curing diseases and that which aims at improving ourselves and our daily lives? And how does one define *improvement*? Does sexual dysfunction rate the same priority for medical attention as HIV/AIDS or cancer? How should we govern the production of genetically modified foods?

These are all questions about nature. We have been interacting with nature for as long as we have been humans, the nature that surrounds us as ambience and shapes us from within, and yet we do not understand nature fully enough, and we have reached no consensus as to its significance. One need only raise certain questions to see the anxieties grow: Are we simply another kind of animal? Does the natural world really exist just for our benefit? Are humans more than a passing scene in the drama of cosmic evolution? The religions of the world are as much challenged by these questions as the secular societies in which we live. At one and the same time, modern science has given us immeasurably more knowledge about nature—from quark to gene to galaxy—and destabilized much of what we have believed about nature over the millennia of human evolution.

This struggle over nature is mirrored in the discussions between science and religion. It is not too much to say that in some circles there is open warfare between contesting ideas of nature. At one end of the spectrum are the "supernaturalists," armed with sophisticated philosophical arguments as to why nature requires a transcendent order. For these thinkers, "naturalism" and "materialism" are epithets characterizing those views that deny the depths and heights of human nature and undercut values as well

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as our attempts to frame the meaningfulness of life. At the other end are the "physicalists," who consider supernaturalism and idealism to be archaic metaphysical systems, strategies for denying that nature is the theater in which values and meaning emerge and play out their roles.

In this contest of ideas, serious hopes and fears are at stake. On the one hand, there is the conviction that nature is an empty idea apart from the values that guide our lives. We are near consensus that nature is not a script from which we can read off values and meanings. The "isms" of naturalism, materialism, and even evolutionism frighten many people, because they seem to threaten the resources from which we derive values and meaning. On the other hand, there are good reasons for insisting that nature and the sciences, rather than inherited philosophies, should serve as baseline for our thinking. Some worry that our values and meaning should rest upon premodern religious and humanistic traditions that have simply lost their credibility in the face of our expanding knowledge of the natural world. Our perennial traditions have the same status as poetry—and how does one bring poetry to bear on scientific knowledge? Furthermore, there is no consensus among these traditions. Jews and Roman Catholics, for example, do not agree on when a human fetus is to be given the dignity of human being. Certain humanistic traditions, along with some religions, value human life on a totally unique level, vastly superior to all other forms of life. Other religions view humans and the animals as siblings.

The religion-and-science discussion includes both supernaturalists and physicalists, but most of us stand at some midpoint on the spectrum. Most thinkers struggle to articulate a position that observes the concerns of both ends of the spectrum and yet provides an alternative to them. We take scientific naturalism with utter seriousness and at the same time believe that there is a "More" to nature that grounds values and meaning. Moreover, we are clear that our quandary over nature is rooted in conflicting ideas about nature—worldviews and metaphysical systems. That is why most of the discussion in this journal takes place at this level of ideas about nature.

This issue of *Zygon* was put together with no thought at all about the struggle of ideas that I have just described. But the reader will see that this struggle runs like a thread through every article.

Ervin Laszlo (philosophy) opens up the issues with his view that the scientific view of nature is itself changing right before our eyes. He will provoke much discussion when he writes: "The perennial religious intuition of a transcendental act of creation is a logical entailment of the randomly entirely improbable fine tuning of the natural laws and processes that the observed universe manifests." Which is the ground for his belief in *both* science and God.

The symposium on Gregory Peterson's book on cognitive science and theology is a gold mine for reflections on nature. In his discussion of

human freedom in the context of the cognitive sciences, Michael Spezio (neuroscience) argues for a multiperspectival approach in which equal validity is granted to our experience of both freedom and determinism. He labels these perspectives "first-person, second-person, and third-person." Dennis Bielfeldt (philosophy, theology) argues that cognitive science cannot escape a physicalist position that stands as antithesis to theology. In his response to Spezio and Bielfeldt, Peterson reflects at length on nature and its possibilities. He introduces an intriguing idea of "deep physicalism," which is preferable to the more common "nonreductive physicalism." Deep physicalism commits itself to scientific explanations while remaining committed "to the stubbornness of the data and does not simply pigeonhole complex phenomena into existing scientific categories."

Philip Clayton (philosophy, theology) focuses on the issue of causation and natural law, giving his own version of a "deep" approach to nature through the concept of emergence. Clayton explicitly seeks a middle position that "reduces the distance" between the two ends of the spectrum that I have described. James Proctor (geography) describes five prevailing metaphors, or visions, of nature that are prevalent today and concludes that nature simply cannot be subsumed under any one of them. He settles for his own kind of multiperspectivalism that acknowledges that the truth about nature is finally a mystery.

The last three articles in this issue present a variety of concrete studies of our theme. Thomistic philosophy has erected a middle position in understanding nature that endures to this day as a major partner in our conversation. Craig Boyd (philosophy) takes us into the current debate over whether Thomas is compatible with sociobiology—a debate that hinges on one's idea of nature. Hector Qirko (anthropology) focuses on empirical study, the evolutionary perspective on altruistic celibacy in religious communities. His piece is a fascinating description of how nature brings both genetic predisposition and culture to bear in concrete strategies of adaptation. Arvind Sharma (comparative religion) tells how the neuroscientific studies of Eugene d'Aquili clarify a classic Hindu text.

We do not settle the issues pertaining to nature in this issue of our journal. We do believe that the authors presented here deepen our understanding of nature and offer insights into why we should devote ourselves to exploring the vast middle ground between supernaturalism and physicalist naturalism.

—Philip Hefner

Thinkpiece

WHY I BELIEVE IN SCIENCE AND BELIEVE IN GOD: A CREDO

by Ervin Laszlo

Abstract. The conflict between science and religion is not irremediable: the world concept of science is changing, and the change brings about a rapprochement with religious beliefs in some fundamental areas. One such area is the question of original creation. Recent findings regarding the nature of the universe show the improbability of its having arisen in the course of a random process. The perennial religious intuition of a transcendental act of creation is a logical entailment of the randomly entirely improbable fine tuning of the natural laws and processes that the observed universe manifests.

Keywords: creation; science-religion conflict; scientific worldview; universe.

As a philosopher of science and concerned humanist, I for one believe in science and also believe in God. I do so without a sense of conflict and contradiction. How is this possible? Many of us grew up with the conviction that the conflict between science and religion is ultimately irremediable. Today this is no longer the case. Although it would be exaggerated to claim that the worldviews of science and of religion are the same, they reach the same fundamental conclusion about the world. In that regard, at least, we can believe in science and, in good conscience, believe in God.

If we are to understand why science and religion—even Western Judeo-Christian religion—reach the same fundamental conclusion about the world, we should understand what science is now telling us about the world.

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This is quite different from what classical science had to say and from what we were told in school and are still being told on television, in newspapers, and by popular-science publications.

Today, in the early years of the twenty-first century, the worldview of science is changing just as profoundly as it did in the early twentieth century, when Einstein substituted the relativistic universe for Newton's mechanistic clockwork universe. The new world concept of science—the concept now emerging at the cutting edges of physics, biology, and consciousness research—is surprising and not generally known. People still believe that science's world is dry and abstract, reducible to numbers and formulas. The universe is a soulless mechanism and life in it a random accident. The specific features of living species seem to result from a succession of accidental events in the history of biological evolution on Earth, and the features of human beings appear to be due to a fortuitous combination of the genes with which they were born. The psyche, in turn, seems to be dominated by elemental drives for self-gratification, so that if people were not afraid of societal repercussions they would steal, kill, commit incest, and engage in promiscuous sexual activity.

This is not the concept of the cutting-edge sciences. The popular ideas of Newton, Darwin, and Freud, the basic sources of today's purportedly scientific views of humanity and the universe, have been overtaken by new discoveries. In the emerging vision the universe is not a lifeless, soulless aggregate of inert chunks of matter; it resembles a living organism more than a dead rock. Life is not a random accident, and the basic drives of the human psyche include far more than drives for sex and self-gratification.

There is a highly significant agreement between the new scientific worldview and the worldview of Christian and other monotheistic religions, but this is not immediately evident. The Judeo-Christian view is that the world is God's creation. God is eternal, omnipotent, and omnipresent. The reality that surrounds us, including ourselves, is the result of divine creativity. Whatever else the Western religious view may hold—and whatever the differences between its various branches, Judaism, Christianity, and the Muslim world may be—creation by a transcendent God is a basic element.

At first glance, anyone believing in science seems obliged to reject the tenet of universe creation by divine agency. Scientists do not agree that the way things are is a result of special acts of creation. They claim instead that the way things are is the result of evolution. But those who believe in an eternal and omnipotent God cannot accept that everything around us is the product of evolution. The random interplay of chance mutations and natural selection seems extremely unlikely to have produced the remarkable spectacle of life and mind. Yet this is precisely what mainstream Darwinists such as Richard Dawkins maintain.

The living world, Dawkins says, may give the impression of having been created for a purpose, but this is an illusion. Cheetahs, for example, give

every indication of having been designed to kill antelopes. The teeth, claws, eyes, nose, leg muscles, backbone, and brain of a cheetah are all precisely what we should expect if God's purpose in creating cheetahs was to maximize the number of deaths among antelopes. At the same time, antelopes are fast, agile, and watchful—seemingly designed to escape cheetahs. Do these and similar facts argue for intelligent design? They do not, according to Dawkins and other Darwinists. Nature was not designed: its seeming purposefulness is the adaptive evolution of specific utility functions. Cheetahs have the utility function to kill antelopes, and antelopes, to escape cheetahs. Nature itself is indifferent to their fate. This is a world of blind physical forces and genetic replication, where some get hurt and others flourish. It has precisely the properties we would expect it to have if at bottom there were no design, no purpose, no evil, and no good, only blind and pitiless indifference.

This world seems to contradict belief in creation by an intelligent and benevolent God. Such a creator must have been indifferent, if not actually a sadist who enjoys spectator blood sports. It is more reasonable, says Dawkins, to hold that the world just *is*, without deeper reason or purpose. The way it is results from random processes played out within limits set by fundamental physical laws.

Creationists, however, cannot agree that all we see in the world, ourselves included, results from random processes and impersonal laws. Scientists cannot come up with manifest proof for their theory of evolution: "You can't go into the laboratory or the field and make the first fish," said Tom Willis, director of the Creation Science Association for Mid-America. The theory that everything evolved by blind chance out of common and simple origins is just that—pure theory. It is not substantiated by solid evidence.

If the creationists and the Darwinists are both right, one cannot believe in science and believe in God. But the creationists and the Darwinists are both wrong, and for the same reason. Evolution is not the chance interplay of random mutations and natural selection. There is more to the emergence of life than classical Darwinists admit. An organism is an interconnected coherent system, and subtle but real connections are being discovered also between organisms and their life-supporting environment. The world of life is a world of wholeness and interconnection—a subtle "web of life," to use the expression made popular by Fritzjof Capra.

Could such a web emerge in the course of time, or must we assume that it was created by divine will and purpose? The emerging scientific insight is that it could emerge in the course of time but that this emergence involves far more than the chance interplay of random mutations in the genome and the elimination of unfit mutants by natural selection. It requires a finely tuned ensemble of natural laws and processes—physical, chemical, and biological conditions under which it could evolve. These

call, in turn, for a universe in which the required physical, chemical, and then biological conditions could emerge. These are remarkable requirements, not likely to be satisfied by the assumption of random processes in an indifferent cosmos.

Science, committed to finding an explanation of the observed facts in natural rather than supernatural terms, comes up against the question, How could the universe be so disposed that it could permit the evolution of life? This must have been more than mere serendipity. A fortunate choice involves selecting our universe from among some 10^{123} alternative universes, each with an equal chance of being *the* universe. If there was no predisposition toward our universe from a supernatural source, the laws of probability dictate that there should have been a set of 10^{123} tries—because only then is there a significant probability of hitting on a universe such as ours.

In the final count, there is no scientifically natural explanation of why our universe is the way it is. This universe is extremely unlikely to have come about by chance. We either admit to an ultimate mystery or recognize that there was some supernatural agency at work. This agency did not create the world as we find it; rather, it created the *preconditions* for the world to evolve into the way it now is. This notion of preconditions—or, better, "potentials"—for evolution is compatible with Christian theology: a similar concept is present in the writings of Saint Augustine. There all changeable things are explained in reference to an immutable and eternal form unrestricted in time and space. This form is in the things of the world as well as in the Divine Mind. In consequence the world tends toward order, with all things moving toward their place.

If the universe we inhabit is a blind concourse of particles and atoms, bringing forth life and mind as accidental by-products of random mixing, we cannot speak of purposeful intelligent design. Classical science has no need of a purposeful Creator; all it requires is a Prime Mover to get its mechanism going. But if the universe is not machinelike but organism-like, it needs more than a random push. It needs highly specific potentials for evolution.

As a number of observers point out, the mechanistic concept has been transcended—first by the relativity revolution and then by the quantum revolution. It is made still more obsolete by the revolution under way today in the life sciences. Thus the question posed by "creationists" and "evolutionists" needs to be reformulated. It is not design *or* evolution. Design and evolution are not mutually exclusive. Quite the contrary, they presuppose each other. There could not have been evolution if a creative agency had not created the potentials for it. Our universe could not have arisen purely by chance. The world as we find it was not created by divine agency, but the *potentials* were created for the world to *become* as we find it.

The difference between science and traditional Christianity in this view of divine agency is not negligible, but it is also not irremediable. Whether we are science-minded or religious, we can agree that there is something higher, or deeper, or greater than the manifest world with its laws and entities and processes. And thus we can believe in science, with its increasingly detailed and precise account of the laws, entities, and processes of this world; and we can believe also in God—in the divine agency that created the potentials so that the laws, the entities, and the processes could come into being—and the stupendous process that brought forth galaxies and stars, and planets around some of the stars, and life on some of the planets, and intelligent life here on Earth, could get under way and bring us the diversity and the harmony, the complexity and the splendor that now meets our eye.

Symposium: Gregory Peterson's Minding God

WHAT DOES SILICON VALLEY HAVE TO DO WITH JERUSALEM?

by Gregory R. Peterson

Abstract. Adapted from the introductory chapter of *Minding God: Theology and the Cognitive Sciences* (Peterson 2003), I here lay out a general approach for a dialogue between theology and cognitive science. Key to this task is an understanding of theology as the science or study of meaning and purpose. I give reasons why theology should be thought of in this sense and the potential fruitfulness of this approach.

Keywords: cognitive science; theological method; theology and science.

The Game of the Century

It was, we were told, the game of the century. In the spring of 1996, Garry Kasparov, one of the greatest chess players in history, lost for the first time to a computer. Of course, the computer in question, named Deep Blue, was not just any machine. Built with the latest technology, Deep Blue could examine millions of chess positions per second, achieving through brute power what it lacked in elegance and finesse. Kasparov went on to win the match, but clearly the writing was on the wall and, indeed, he would lose the following year. The press milked the match for all that it was worth. Chess, that most rational of all games, had long been touted as the pinnacle of the human intellect, the symbol of the thinking mind over

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and against the thoughtless machine. Kasparov was playing not simply for the $600,000 purse but for humankind. He was a modern-day John Henry, defending the dignity of our species.

Of course, the experts knew better. Deep Blue was, at best, an idiot savant. It could do only one thing: play chess. Critics pointed out that even that statement might be too much. After all, it could not see the chessboard, study its opponent, or move the pieces itself. It certainly could not stretch, read a good book, or order food at a restaurant. If anything, Deep Blue established what many already knew: that chess is not a very interesting indicator of what makes us human and that computers are very, very good at narrowly defined problems that are, relatively speaking, easy to calculate. Computers, unlike humans, do not have minds.

Many consoled themselves with just this observation. That Kasparov had lost to a glorified calculator should be neither surprising nor alarming. Comfort could be taken in the fact that the computer had not actually *thought* about its moves but worked largely by searching ahead over billions of possibilities. If a computer had to be able to examine millions of positions a second to beat a human being, the human mind must be pretty special indeed.

Ironically, these observations and responses, as accurate as many of them are, nevertheless testify to the fragility of the human ego and to the importance that we place on our mental abilities. Over the centuries, humankind often has claimed a special place in the scheme of things. We are, the argument goes, unique among all creatures upon Earth, and in a way that sets us above all. Wings make birds different, but they do not make birds special. It is our minds that make humans special. We can think, reason, and argue in ways not possible for any other creature on Earth. We can speak, reflect upon ourselves, and act morally. We laugh. We sin.

Enter the sciences. On one account, the story of science is the story of the ever-shrinking significance of humankind in the universe. First, Copernicus told us that Earth, and therefore humanity, was not at the center of the universe. Then Darwin told us that we were not specially created but an apparently unintended happenstance of natural selection. Computers like Deep Blue represent the culmination of humankind's dethronement. First we lose our place, then we lose our bodies, and finally we lose our minds. We are not, it turns out, deeply spiritual beings but merely sophisticated and somewhat clunky calculators. On this reading, not only are *we* not significant; nothing is. Life is simply a complex concatenation of atoms and molecules colliding in space. The end.

There is, however, another story that is more interesting and more persuasive. This story also includes the sciences, but its conclusion is radically different. Our significance is not lost but rather redefined. Reduction is complemented by emergence. We are more than clunky calculators; we are rich, social beings, more than the sum of our parts. In this story, the

cognitive sciences, the sciences of the mind, play a prominent role. Frequently, the physical sciences are seen to be the enemy of culture, reducing the rich to the bland and the mysterious to a chemical soup. While cognitive science frequently shares the methodological reduction of the physical sciences, it also reveals the interconnectedness and irreducible quality of the mind. As such, cognitive science also can be a tool for thinking about greater realities.

These greater realities, I argue, include theology. The link between cognitive science and theology may not immediately be obvious. Cognitive scientists talk about such things as neurons, visual perception, and brain modules; theologians talk about God, redemption, and social justice. Yet, while much of theology is God-talk, a great deal of it is concerned with broadly anthropological questions. Claims about human nature, human proclivities, and human potential are central to a theological understanding of the world. Cognitive science has much to say about all three. Religious literature traditionally and consistently has described God in personal, or at least personlike, terms. Indeed, at least a part of the theological tradition has seen the relationship of God and the world as being explicitly analogous to the relationship of mind and body. If our view of the latter changes, does the former as well?

Research in the cognitive sciences has revolutionized the way we think about mind, human nature, and our relationship to the world. Although this revolution sometimes has carried unfortunate philosophical baggage, it has dramatically improved our knowledge and understanding. Some of the findings and perspectives of cognitive science have the potential to revolutionize theology or at least subtly provide new insights and new perspectives into traditional areas of inquiry. To this end, cognitive science can provide a lens for doing theology. While a lens may seem to distort, its ultimate purpose is to clarify. Cognitive science can at times challenge traditional theological claims, but it also can provide models and metaphors for clarifying theological understandings of God, the world, and human nature. As a result, we gain a richer understanding of ourselves.

Silicon Valley

"Quid ergo Athenis et Hierosolymis?" "What," Tertullian rhetorically asked, has Athens to do with Jerusalem?" (*On the Prescription of Heretics*, 7:19). Theologians from time to time since Tertullian have felt, as he did, that theology has little to learn and nothing to gain from dialogue with philosophy or, in the modern period, its science-minded offspring. Theology, it is said, is autonomous and relies solely on the revealed word of God. To subsume theology under a broader philosophical rubric is to reduce the significance and distinctiveness of the theological message. Likewise, to acknowledge the significance of the sciences for theological reflection is,

on some accounts, to misunderstand the domain and even the meaning of the terms *theology* and *science*. Theology deals with the spiritual realm, science with the material.

Such declarations, while noble in their intent, tend to be misguided and even disingenuous in their execution. Tertullian himself could not completely eschew philosophical categories and modes of thought. Karl Barth and other modern thinkers built their theological systems under the influence of such philosophers as Søren Kierkegaard and Martin Heidegger. Indeed, at the same time that these theologians distanced themselves from philosophical discourse, they inevitably used characterizations of theology, philosophy, and science that themselves required sophisticated philosophical analysis. The real question, it turns out, is not whether to engage philosophy but how.

Similar statements may be made about the natural sciences. It might even be said that the real question of the twentieth century was not whether and how theology should engage philosophy but whether and how theology should engage the natural sciences. Many of the dynamics of twentieth-century theology and religion can be seen precisely as a response to the encroachment and shaping influences of the sciences. Neoorthodox and existentialist theologies could establish the separateness of theology only by largely confining its subject matter to the human subject, which alone seemed impervious to scientific investigation. Religious conservatives and fundamentalists, at least in the United States, frequently have taken a different approach, acknowledging the significance of the sciences but engaging in head-on conflict. Process theologians and those engaged in the ongoing and growing religion-and-science dialogue have prominently opposed this trend, arguing that theology and science can and should avoid conflict and embrace dialogue or even outright synthesis under a broader metaphysical rubric (see Barbour 1997, chap. 4).

If Tertullian were alive today, he might contrast Jerusalem not with Athens but with, say, Los Alamos or Fermilab. If we were to speak of the cognitive sciences, however, we would have to pick another locale. In the early twenty-first century, many might rephrase Tertullian's question: What does Silicon Valley have to do with Jerusalem?

Why Silicon Valley? As home to the computer and software industry in the United States, Silicon Valley has little to do directly with cognitive science. Although Silicon Valley programmers freely use expert systems originally designed by researchers in artificial (computer) intelligence interested in modeling the human brain, their interests tend to be completely commercial in character with little concern for the broader research and philosophical questions posed by artificial intelligence specifically or cognitive science generally.

Yet, there is a certain appropriateness as well. The desktop computer has become in the past half century the primary metaphor for understand-

ing the human mind, however inadequate we now realize that metaphor to be. To speak of the brain as being "hard-wired" and to speak of mental activities in analogy to software is commonplace. Conversely, computer scientists often have co-opted the language of biology, speaking of the computer chip as the "brains" of the computer. Computers catch "viruses," which can be transmitted from other computers like germs. More than this, however, Silicon Valley also reminds us of the continual advance of computer technology, an advance that, according to some advocates, will eventually surpass that of the human mind and produce an understanding of cognition heretofore unthinkable. The giant mainframe computers of the 1950s and 1960s are now dwarfed in computing power by personal digital assistants that fit in the palm of one's hand. Moore's law, which predicts that computing power will double every eighteen months, has become a staple of the industry. In this sense, Silicon Valley represents the modern incarnation of scientific progress, an incarnation that threatens to eventually overtake the human subject itself.

This image of Silicon Valley and the computer industry is even promoted as utopian. Futurists such as Ray Kurzweil (1999) and Hans Moravec (1990) foresee a future when human beings as biological organisms are replaced by artificial life forms, enabling our very consciousness to be "downloaded" onto a vast computer network that will allow us to achieve a kind of immortality. Implicit in this image is the claim that such technological advances will lead to a complete understanding of the human mind and spirit. It is a short step from here to the claim that human beings are "nothing but" sophisticated computers and that human nature can properly be understood only within a naturalistic, technological context. Consequently, there appears to be little room left for religion. Silicon Valley indeed seems to have little to do with Jerusalem.

The metaphor of Silicon Valley may be the most familiar of the public faces that have some relation to cognitive science, but it is not the only one and certainly not the best. In many ways, modern cognitive science roots itself in the grand philosophical tradition from Plato to Descartes. Cognitive science, at its most basic, is the science of *thinking*. The study of language, reasoning ability, memory, and perception—all topics traditionally associated with the notion of thinking—have been key areas of investigation for cognitive science, and many of its early successes and influential theories dealt with these subjects. More recently, the notion of what counts as thinking has changed significantly, as the role of the emotions, the body, and the environment have increasingly come under the scrutiny of the cognitive sciences as well. Silicon Valley is a mere cipher for what cognitive science engages. Thinking, we are often led to believe, is what Deep Blue and desktop computers do. Presumably we pale in comparison. Yet, the cognitive sciences in many ways show us something significantly different, something stranger and more beautiful at the same time.

The image of Silicon Valley, in its emphasis on computers, also fails to convey the breadth and interdisciplinary character of cognitive science. One may say, in fact, that cognitive science represents not a single discipline as much as an array of disciplines united by a common perspective and research agenda. One may speak metaphorically of the vertical and horizontal interdisciplinarity of the cognitive sciences. Vertically, modern cognitive science includes such fields as neuroscience, cognitive psychology, linguistics, and anthropology, each analyzing a different layer (so to speak) of the human person. Horizontally, cognitive science is not devoted to the human subject alone but includes the study of artificial (as in computers and robots), animal, and (speculatively) extraterrestrial intelligences as well. In fact, one of the strongest implications of the interdisciplinary character of cognitive science is that, whatever we may prefer to believe, it is clear that we are not alone in the universe when it comes to activities of the mind. Without a doubt, we are different, but in a way that connects us with other organisms and with the rest of the physical world.

So no one "Athens," no one place or image, adequately serves as a symbol for all that cognitive science now encompasses. Yet, many places embody certain aspects and ideals, including the Artificial Intelligence lab at MIT, the Yerkes Primatology lab in Atlanta, and the Center for Brain and Cognition in San Diego. Collectively, they form a sort of Athens that is shaping the way that we think about ourselves and our place in the world. Like physics, chemistry, and biology, the cognitive sciences are not some passing trend but are here to stay. It is appropriate to ask what the significance of this new Athens is.

Jerusalem

There are many today who are content to repeat Tertullian's dictum or at least to modify it. It may be conceded that theology and philosophy are inevitably intertwined, but often a line is drawn at the sciences. There is a certain intuitiveness to this move. After all, theology is focused on the study of God; the sciences not only do not speak of God but seem to purposefully exclude all God-talk or appeal to divine activity. Like oil and water, theology and science simply do not mix.

Serious study, however, quickly reveals that while we may reasonably conclude that theology is an autonomous discipline, with its own norms and subject matter, absolute separation of theology and science typically relies on a conception of theology that is severely restricted in its claims and scope. Ultimately, theology makes claims about the world if for no other reason than it is primarily about God's relationship to the world that theology traditionally has been concerned. Doing theology inevitably entails some kind of encounter with the sciences, even if only at the minimal level of radically relativizing either theological or scientific claims in order to make coexistence possible.

As we shall see, the encounter of theology and science is particularly unavoidable in the case of the cognitive sciences. True, cognitive science does not study God. Or, to put it bluntly, God is not the kind of intelligence that cognitive science investigates. The reverse is not true: although cognitive science is not interested in theology, theology is tremendously interested in issues pertaining to human nature, a subject about which the cognitive sciences have much to say. Officially, theology is concerned with the nature and action of God. In practice, much of theology is anthropological in character and dedicated to providing an understanding of the human person and the human situation. Theology speaks of God because, in no small part, God is important to human beings. According to Christian tradition, we are made in the image of God yet suffer from a fallen state that involves separation from God. This sense of alienation is overcome only by the sacrifice of Christ, who offers a transformed life and reveals a future hope. God is important precisely because belief in God profoundly affects how we think of ourselves.

Historically, theological anthropologies have two broad concerns. First, they often are metaphysical in character, providing an explanation of human nature, its ultimate origins, current propensities, and ultimate fate. As a consequence, theology traditionally has attempted to explain what is meant by the image of God, in what ways we are (or are not) free, and what we mean by such terms as *soul* and *spirit*. Theology also explains our place in the world, often through the doctrine of the image of God, as well as our expected purpose and behavior. Second, and perhaps more important, theology is soteriological in character. Theology develops concepts such as sin, conversion, and sanctification because they provide the framework within which human purpose and happiness are understood. Inevitably, soteriology and metaphysics are connected. Metaphysics helps us to understand our current predicament; soteriology informs us how to transform it.

Cognitive science affects both metaphysical and soteriological accounts of human nature. Metaphysically, cognitive science profoundly affects how we think of issues of human origins, mind and body, the unity of the human person, and the potential for human freedom. Soteriologically, cognitive science influences how we think of mental health and thus human well-being, our relationship to other organisms, and the nature of human cooperation. Certainly this "soteriological streak" is present among popularizers of psychology and specific branches of cognitive science. One can view with some legitimacy the development of the popular-psychology and self-help market as, in some ways, a competing secular soteriology whose intent is to at least tacitly replace the religious soteriologies that many find no longer satisfying. One need only consider the success of such books as Daniel Goleman's *Emotional Intelligence* and Howard Gardner's several books and spinoffs on multiple intelligences to see the

influence of cognitive science on the popular-psychology market (Goleman 1997; Gardner 1993). This soteriological character is even more evident in the futurist writings of Moravec and Kurzweil, both of whom envision a kind of future technological paradise brought about by the union of human intelligence and computer/robot technology.

The theologian may look upon this soteriological streak as illegitimate, as an unacknowledged sleight of hand that moves from science to religion. Such works suffer from the mistake of scientism, conflating scientific findings with religious and philosophical claims and generalizations. While these observations are pertinent, they risk missing the larger point, which is that, although the metaphysics and soteriology we are speaking of are separate and distinct from the cognitive sciences, they should not be addressed in isolation from the cognitive sciences, precisely because the findings of cognitive sciences have the potential to significantly affect how we think about these issues. Any claim of human uniqueness needs to take into account at some level the now extensive research on animal (especially primate) intelligence and social behavior. Any soteriology that makes claims about human transformation needs to take stock of the increasingly integrated account of mind, brain, and body that the cognitive sciences reveal as well as the increasingly close ties being discovered between cognition, emotion, and concepts of mental health. Such findings may not determine which metaphysical or soteriological move to make, but they can strongly influence and even limit the discussion.

One of the traditional strategies for declaring the independence of science and religion, and therefore the independence of science *for* religion, becomes particularly problematic when the cognitive sciences are taken into account. On these accounts, true religion deals with and arises out of human subjectivity. How this occurs has been expounded in various ways. Immanuel Kant can be credited with beginning this shift with his account of the transcendental subject and, through it, to moral discourse. Shortly thereafter, Friedrich Schleiermacher famously tied religion to a particular kind of experience, the feeling of absolute dependence. While Schleiermacher had multiple motivations for moving in this direction, one of the desired effects was to provide an account of religion that was compatible with the Newtonian science of the day. Because that science could say nothing significant about human subjectivity and, indeed, seemed unlikely to, the identification of human subjectivity with the source of religion had, for this and other reasons, great appeal and success. This success is evident in such diverse thinkers as Kierkegaard, Rudolf Otto, and Mircea Eliade. It has been no less influential among modern theologians. Although Barth distanced himself from the tradition of liberal theology inaugurated by Schleiermacher, he nevertheless retained the liberals' emphasis on the subject. The existentialist theologies of such thinkers as Rudolf Bultmann also emphasize the primacy of the subject, relativizing the claims

of religion in a way that makes no claims about the physical world while at the same time identifying religion with a concept of the human subject as distant from and even untouchable by the physical sciences.

Theologians may claim, after all is said and done, that a theological analysis of the human subject has something unique and distinct to contribute, but it is increasingly clear that such claims can no longer be made as if the sciences have nothing to contribute. A completely transcendent subject no longer seems conceivable, because much of what it does clearly arises out of and is made possible by the processes of the brain. We may reason about morality as cogently as Kant did and feel as deeply as Schleiermacher, but it is clearly our biology that makes this possible.

What is needed, therefore, is not a kind of theological isolationism but rather interdisciplinary engagement. This kind of engagement has proceeded for some time with physics and biology, as can be seen in the works of John Polkinghorne (1996) and Arthur Peacocke (1993). Individuals such as Donald MacKay and James Ashbrook provided early models of dialogue and engagement between religion and neuroscience, but only within the past decade has a serious body of literature been built up. There is a great deal of work yet to do, and the full implications of the cognitive sciences for theology have yet to be fully addressed.

Jerusalem Engaging Athens

In what follows I make two arguments, one explicit and one implicit. Explicitly, I argue that serious consideration of the cognitive sciences stands to affect nearly every facet of Christian theological thinking. In doing so, I primarily engage the classic themes and doctrines that have defined the Catholic and Protestant traditions of Western Christian thought. Consequently, issues of human nature, the nature of God, and the relation of humankind to the world are major subjects of exploration. Implicitly, it should also become clear that cognitive science has implications not simply for conventional, denominationally orthodox modes of theology but for all modes of theological thinking. In the late twentieth and early twenty-first centuries, theology as a discipline has been characterized more than anything else by radical methodological pluralism. Some methodologies, such as process thought, have inclined toward dialogue with the sciences; others, such as some versions of postmodern, pragmatist, and deconstructionist theology, have either rejected dialogue altogether or approached the sciences as one "social text" among others, with no special authority or importance. The current work cannot fully engage this diversity, but I contend that all forms of theology stand to be influenced by serious dialogue with the cognitive sciences. That is, inasmuch as methodology and content are connected, the content of the cognitive sciences can affect to some extent how we go about *doing* theology.

Moreover, a theology that engages the cognitive sciences must be aware of two other contexts. First, the engagement takes place in the context of a larger science-and-theology/science-and-religion dialogue. One could argue that there has never been a period when science and theology have not been in dialogue. The reflections of such significant figures as Augustine and Aquinas were as much influenced by the "science" of their day as the natural theologies of the eighteenth century and the empirical and process theologies of the twentieth. In recent decades, this science-and-theology dialogue has taken on a quite definite shape, spurred most significantly by the work of Ian Barbour but also influenced and shaped by other scholars in the United States and Europe (see Barbour 1997). The result is that science-and-religion now represents a rather distinct subfield, characterized increasingly by a number of its own specializations. Any current work on science and theology must now be interpreted in relation to this broader dialogue.

At the same time, any dialogue between theology and cognitive science should be cognizant of not only theological pluralism but also religious pluralism. It is increasingly the case that Christians are not the only ones taking the claims of the sciences (including the cognitive sciences) seriously. There is potential for a rich "trialogue" between religious traditions on the matters of science as each works through issues of borders, compatibility, and interpretation. Awareness of this pluralism should make us wary of any attempt to swiftly "baptize" science with the imprimatur of one's own tradition.

Acknowledging these two contexts, one relatively narrow and the other quite broad, is one way of situating the kind of theology and theological dialogue that is most appropriate. For practical purposes, I assume a rather broad understanding of the nature and task of theology while at the same time engaging in sometimes quite specific doctrines and issues, such as original sin and the personhood of God. The specificity serves a dual purpose, showing not only how the cognitive sciences require us to rethink particular doctrines but also how thinking theologically about the cognitive sciences should proceed. Arguments about such doctrines as the image of God, therefore, are both substantive and illustrative, pointing to the possibilities for yet further kinds of discussion in different arenas. My goal is to engage the widest audience possible while at the same time acknowledging the plurality that is necessarily present.

Broadly conceived, then, I take theology to be that field of inquiry whose primary purpose is to discern the meaning and purpose of life. Theology, more than any other discipline, is concerned with the task of providing orientation and direction for the individual. It attempts to answer those questions asked on clear, starry nights and in the deepest, darkest moments. Who am I? Why am I here? What is my purpose? How should I act? How can I be fulfilled? Historically, these all have been theological

questions, and it has been primarily the task of theologians and religious traditions to answer them. Certainly, such questions require some philosophical acumen as well, but as philosophy has attempted to answer them, it has become increasingly religious in character. This can be seen clearly in the philosophies of the Hellenistic and Roman periods, such as Neoplatonism and Stoicism. The work and followers of Karl Marx and Friedrich Nietzsche provide modern counterparts. The adoption of the term *theology* by Buddhists and Hindus indicates the extent to which this broad understanding of theology now exists, even though to speak of Buddhist theology in a literal sense can be a contradiction in terms.

What historically has given theology much of its character is its effort to answer such questions in terms of a worldview. Any attempt to provide such an orienting worldview is, in effect, a theology. The reason that naturalist philosophies of various stripes often have so many negative things to say about religion is precisely because of their (one might say ironically) theological character. In the "evolution wars" that take place especially in the United States, the importance of natural selection for both naturalists and theists in the debate has, arguably, little to do with the scientific merits of the theory and much to do with the implications the theory is said to have for the important theological questions of meaning and purpose. The argument is partially about science, but it is very much about theology.

Christian theology, then, represents only one mode of doing theology. Like most theologies, Christian theology provides a worldview that orients believers in their interior lives and outward behavior. For Christians, this worldview has spoken preeminently of the ultimate role and nature of God, whose actions create, redeem, and sustain the world. Such a worldview is quite specific in many of its claims and, consequently, quite successful in its attempts to orient believers and answer the basic questions of meaning and purpose. At the same time, Christian theology traditionally has relied on concepts and claims that are not accessible by empirical observation but only through revelation. The category of faith has played an important role historically and still does. To borrow a phrase from the philosophy of science, human experience underdetermines the Christian (and, one may say with little hesitation, nearly any) worldview. As with every theological tradition, Christian theology is a complex mix of considered reasons, deeply held convictions, and (occasionally) best guesses.

Ideally, however, theology is a rational enterprise that finds its place among (some would still say above) other academic disciplines. As such, any given theology needs to justify its claims in the relevant public spheres. To the extent that theology relies on the categories of revelation and faith, however, theology is not truly public but, at least traditionally, relies on some authority (the church, the creeds, the Bible) whose veracity and utility rely more on the category of faith than of reason. As a result, one primary task of theologians has been to explicate how and in what ways

theology and theological claims are rationally defensible. As with any area of inquiry, they must answer the basic question, "Why would anyone believe *that*?"

For theology, a first task is an elucidation of exactly what *that* is. *God*, *the soul*, and *salvation* are all multivalent terms that historically have taken on a range of meanings. God may be taken to be Aristotle's unmoved mover or Hegel's world-spirit. The soul has been variously defined as the form of the body (Aquinas, following Aristotle) or as a separate, distinct, nonextended thinking thing (Descartes). In the modern period, such questions of definition and ontology, particularly as applied to God, have become strikingly important and widely divergent. God is variously conceived to be a special kind of actual entity (process theology), the ground of being (Paul Tillich), or the mysterious and serendipitous creativity of the universe (Kaufman 1993). Alternatively, the multivalence of theological terms may be retained in a way that opts not for a literal or quasi-literal explication but instead for the language of symbol and metaphor. Thus, at the same time that Tillich speaks of God as the ground of being, he acknowledges the symbolic character of religious language that militates against overly literalistic accounts of God that presume more than we know.

This symbolic character of theological discourse has been a partial consequence of the historically holistic nature of theological reflection. Unlike other rational enterprises, theology as a discipline has been inclined to draw from the philosophically messy realms of personal experience, literary analysis, and artistic insight. For most of the sciences, words are descriptive, used to provide as transparent an account of the relevant phenomena as possible. For many forms of theology, however, words are also disclosive, harboring the potential to elicit new experiences and insights on the part of the reader.

As a result, most theologies can be seen to lie along what might be called a poetic-scientific continuum. Theologies that tend toward the poetic eschew the categories of literal, scientific rationality in favor of modes of writing and expression that seek to open up new vistas, not test new theories. Such theologies are not unique to Christian thought; they may be found in Jewish, Muslim, and Buddhist contexts as well. Scientific theologies seek to do precisely the opposite. In this approach, *God* denotes a particular kind of being or reality in relation to ourselves and to the world, and the purpose of theology is to elucidate a system or theory that is explanatory in character. While poetic theologies tend toward the symbolic and metaphorical, scientific theologies tend toward the literal. Definitions, propositional claims, and rational argumentation often play an important role in scientific theologies.

In speaking of scientific theology, I am of course using the term *scientific* in its broadest sense to denote any mode of rational inquiry. Rational categories are used either to demonstrate the veracity of specific Christian

doctrines or to limit the claims of a universal, rational discourse, thereby making room for the category of faith. Aquinas used philosophical categories to demonstrate the existence of God. Kierkegaard used Hegel's dialectical reason to demonstrate its own limitations in the face of genuine religious commitment. Both rational strategies are commonly used, sometimes by the same thinkers. Theologies that engage a lived faith, however, must consistently attempt (one might say risk) the former, positive approach. For theology to be relevant, it must make claims about the world. To make such claims, it must inevitably engage rational modes of thought.

The notion of a scientific theology has been put forward several times over the past century, albeit with quite different ideas about what *scientific* meant. Neoorthodox theologians have used the term, as have those in mid-century empirical theology (e.g., Torrance 1969; Burhoe 1981). More recently, some theologians have embraced the philosophy of science as a means for providing a theological method. In this approach, theology is scientific to the extent that it shares the same method of intellectual inquiry with other, well-established sciences. Wolfhart Pannenberg (1976), for instance, justifies speaking of theology as the science of God by appeal to theology's ability to follow the scientific method as described by Karl Popper and others. Nancey Murphy (1990) goes much further, claiming that while theology may not currently be scientific in character, it can and should be. Building on the thought of philosopher of science Imre Lakatos, she sees theology in terms of competing research programs, consisting of core claims that are elucidated and evaluated in terms of their empirical confirmation and comparison to the success of other research programs.

The cognitive sciences may be relevant to the whole spectrum of theological thinking, but it is this latter, more scientifically oriented, form of theology that I most wish to engage, partly because this form of theology is most impacted by the kinds of claims coming out of the cognitive sciences. Scientifically oriented theologies make the most specific claims and, consequently, have the most at stake in the areas where science and theology meet. But this form of theology is most engaged as well, because, in my estimation, it has a significant impact on how we think and act. A theology that takes a stand, for instance, on human uniqueness takes a stand as well on how we interact with all the other subjects and objects in the world. In the end, such theologies often claim too much, which is one reason why history is replete with bygone theological systems. Even from failures, however, there is something to be learned, and it is only through the processes of construction and engagement that true theological wisdom can develop.

Notes

1. For the early work, see MacKay 1980 and Ashbrook 1984. For more recent work, see Ashbrook and Albright 1997; Brown, Murphy, and Maloney 1998; Watts 2002.

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DO SPLIT BRAINS LISTEN TO PROZAC?

by Gregory R. Peterson

Abstract. Cognitive science challenges our understandings of self and freedom. In this article, adapted from a chapter in *Minding God: Theology and the Cognitive Sciences* (Peterson 2003), I review some of the scientific literature with regard to issues of self and freedom. I argue that our sense of self is a construct and heavily dependent on the kind of brain that we have. Furthermore, understanding the issue of freedom requires an understanding of the findings of cognitive science. Human beings are constrained to be free; our biology in no small way determines the kinds of freedom that we are able to have.

Keywords: Antonio Damasio; emotion; freedom; Martin Luther; V. S. Ramachandran; self; split brains.

In the autumn of 1524, Desiderius Erasmus published a treatise on the freedom of the will. Erasmus was concerned with certain statements that Martin Luther had made on the subject that implied the will's bondage and human inability to do good. Erasmus had been a sympathetic supporter of many of Luther's reforms, but the latter's claim that the will was in bondage to sin and incapable of doing good without the grace of Christ seemed incomprehensible to Erasmus. How, Erasmus argued, can we expect God to judge us on our moral actions if we are not truly free to do both good and evil? If we are not free to either accept or reject the grace of Christ, in what sense is God's damnation of those who reject Christ just?

Luther's now famous intemperate response not only rejected Erasmus's arguments but insulted his character as well. Luther argued that to admit to any human freedom to do good was to admit that the grace of Christ is not necessary. Not only did such a position make the death of Christ on the cross cruelly meaningless, it made those who could not achieve such

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moral perfection all the more guilty. If some could achieve perfection, all could. Such a claim ran counter to Luther's own experience. It made the hope of salvation impossible for all but the elite few and undermined the foundation of church, scripture, and sacrament. For Luther, the question of freedom was not simply academic but an intensely personal issue that determined the state of one's own salvation. The vehemence of Luther's reply stunned Erasmus, with the result that their once cordial relationship soured as they went their separate ways theologically and politically.[1]

As the Luther-Erasmus debate shows, freedom is a profoundly theological category with significant implications for how we see ourselves in the world and for how we perceive our ultimate goals. Yet, freedom is not an abstract category of intellectual fancy but a lived reality that, for most of us, is experienced or frustrated daily. As such, freedom is the property not only of theology but also of psychology and biology. It is thus not surprising that, although freedom is not a subject per se of cognitive science, research in the cognitive sciences nevertheless touches on our understanding of human freedom. Such insights do not ultimately decide the issue between Luther and Erasmus, but they do show us that the freedom that we have is of a very special kind, profoundly shaped by our biology but profoundly open as well.

The Theological Subject

Luther's position is now unpopular. Freedom is the most cherished of values, enshrined in political documents and the basis of many of our cultural convictions. Certainly the value of political freedom laid the ground not only for democracy but also for racial and sexual emancipation. The claim of moral freedom underlies our ethical and legal systems. It even underpins much of the Western approach to education, for to study the *liberal* arts is to engage in a kind of study that makes one free.

Defining freedom, however, is a more complex task. Among other things, freedom implies a unified subject who does the choosing. It also implies the ability for real and substantial transformation. The path of freedom is typically nonlinear, revealing many twists and turns as life progresses. Freedom implies choice, the ability of the individual subject to select between alternatives without coercion. In many ways, the quest for freedom has been the quest of modern Western society.

Freedom has a theological dimension as well. The task of theology is to provide a framework for understanding the meaning and purpose of life. From this framework issues a soteriology, a path of salvation or liberation from the chains of sin and evil that bind us. In some ways, freedom is the most important of theological categories, for it denotes that which we value the most. The question of freedom ultimately addresses the most basic of questions: Who am I? A free person is presumably different from one who

is not. Those who can hope for freedom have a purpose in life that orients them in relation to their current situation. To the extent that freedom becomes the basis of such hope, it becomes one of the starting points of theology as well. This has certainly been the case in contemporary theology. As a theological category, freedom has loomed large for neoorthodox, existentialist, process, and liberation theologians alike. Although there are significant differences among these theological movements as to how freedom is understood, as a generalization the category of freedom is theologically important in two ways.

First, the category of freedom is important for understanding the human plight. To the extent that theology needs to develop a metaphysic, it requires an anthropology that situates human beings in relation to the world. Here, the theological question of freedom is in many ways identical to the philosophical one. Are my decisions based on my own volition, or are they controlled by outside forces, whether they be gods or demons, the billiard-ball particles of Newtonian physics, or the selfish genes of extreme neo-Darwinism? Freedom is here contrasted with determinism. Such freedom presupposes an autonomous, unified subject capable of making the decisions in question. Without the autonomous subject, the question of freedom in this sense becomes moot. This metaphysical conception of freedom has been a core issue in theological debates about predestination dating back to Augustine and was at the core of Erasmus's concern about Luther's position on the bondage of the will.

Second, freedom is important as a category for understanding our ultimate purpose and direction—that is, for soteriology. In Christian theology, freedom is important not only for understanding how we act now but also in defining what we seek ultimately. This conception of freedom is identified not simply with choice but with entering a new state of being. Soteriologically, freedom means freedom from sin and the evils of this world as well as participation in the spiritual community both in this life and in the next. This soteriological sense of freedom is not unique to Christianity. It has its version in many of the world's religions. Arguably, the debate between Luther and Erasmus on freedom hinged in part in their different usages of the word. Although Erasmus was concerned with freedom as a soteriological category, his attack targeted those issues most related to philosophical, metaphysical freedom. Luther, by contrast, was most concerned with freedom in the soteriological sense. Ultimately, the two are linked, but the Luther-Erasmus debate shows how the different emphases can lead to profoundly different perceptions about what it is about freedom that is so important.

Cognitive science poses provocative questions and possibilities for thinking theologically about freedom. Metaphysically, it poses questions about the kind of freedom we have and, in particular, the extent to which we can consider the self as a unified autonomous subject. Soteriologically, the

study of emotions may prove to be of some importance for thinking about personal transformation, orientation, and well-being. In both cases, we see a glimpse of the complexity of the human person.

One Body, One Mind?

I am. Such a statement seems unproblematic. Generally, I face the world as a unified individual, and I assume the same for others. This unity is the most basic of premises and often has served as the foundation of philosophical systems. Descartes' thinking self was the undoubtable core of his philosophy. Kant's transcendental subject played much the same role in his critical philosophy. The experience of unity is fundamental on a more prosaic level as well. We simply expect there to be one mind to one body, no more and no less. Such expectations allow us to assume considerable continuity among those with whom we interact. My colleagues in the English department may have their ups and downs, but I can expect them to have the same personality and roughly the same behavioral repertoire not only today and tomorrow but even across years and decades. What a great surprise it is when this is not the case. Of someone who has undergone a radical change in lifestyle and behavior, we may say, "She's not even the same person anymore!"

That we are unified subjects is central for traditional understandings of human freedom. Metaphysically, I am free because it is *I* who make the decisions, not someone else. Some of us do recognize the complexity of our inner lives. In his *Confessions*, Augustine perceptively describes the internal conflicts that he suffered on the path to conversion. Ultimately, however, Augustine rejected a radically dualistic understanding of the human person and held that such conflicts occur within the unified individual, who is thus responsible for both the good and ill deeds that he or she performs. Such an understanding of unity underlies our sense of personal responsibility and the legal system. To say that the devil made me do it, or my genes, or my environment, usually does not go far as a legal or personal defense. Ultimately, *you* did it, not someone else.

The easy unity that we experience, however, is not as easy to comprehend or as simple as it appears. The fact and physical roots of our consciousness may lie forever in mystery, but it is clear that our consciousness exists very much in context. The old dualist metaphor that the body is like a ship and the soul like a ship's captain seems exceedingly unlikely. Rather, we are conscious because it is necessary for the kind of complex beings that we are. Our conscious selves play an important and integral role in our day-to-day activities and, for much of the history of our species, in the basic struggle for survival. As such, our conscious life does not exist in the abstract but is intimately tied to the whole of our experience. Philosophers often have differentiated between the fact of consciousness and the

more holistically conceived self-conscious person, a distinction increasingly made by neuroscientists as well, who differentiate between core and extended consciousness.[2] A person is not simply a bundle of experiences but an intentional subject who thinks, feels, remembers, and interacts with the surrounding environment. Degenerative diseases that cause the loss of personhood without significantly impairing core consciousness are among the most tragic of maladies. Anyone who has seen the distressing toll that Alzheimer's disease or severe stroke damage can take can testify to the sheer devastation.

Loss or diminishment of personhood can occur in other ways. Damage to the hippocampus can result in anterograde amnesia, a condition that involves the total inability to establish new, declarative memories. This condition was first made famous by a patient known as H. M., who suffered catastrophic memory loss after removal of brain tissue in the hopes of ending his debilitating epileptic seizures (Scoville and Milner 1957).[3] The seizures ended, but H. M. was left in a world that consisted of only those memories he had accumulated before the surgery and an eternal present that could never be recalled. As a result, he could not remember for more than a few moments anything that happened to him. Each encounter, each individual, each event was new to him. Quite suddenly, he was forever unable to make new relationships or maintain old ones. Each time that he inquired about his uncle, he would grieve anew on hearing that the uncle had passed away. As he grew older, he even became unable to recognize his own face in a mirror, so different was it from the memory of his own face as a young man.

Despite the tragic results of the brain surgery, H. M. retained conscious functioning, expressed emotions, and showed no diminishment in IQ. For these reasons, most of us would grant him the status of personhood. But it was a significantly diminished personhood. Not only was he essentially cut off from the rest of the world, he also was in a significant way cut off from himself—unable to grow, mature, or tackle new challenges, which are functions of normal life. There was one exception. Although H. M. had lost declarative memory, it was eventually discovered that he retained procedural memory. He could not remember a new name or new face, but he could learn new skill tasks, such as drawing a circle. It was discovered that, unlike declarative memory, procedural memory does not rely on the hippocampus for proper functioning. Consequently, he could learn new physical tasks but could not remember when or how he had learned them.

Cases such as H. M.'s were among the first in cognitive neuroscience to clearly demonstrate that the *I* of my extended, reflective consciousness arises out of the complex interactions of a number of brain processes operating in parallel. When specific areas of the brain are damaged, we begin to see how much of the self is a construct of complex interactions. The unity that we experience appears to be the end result of a finely tuned and

ongoing process. The self is an emergent reality, blossoming out of the interaction of mind, brain, body, and environment.

The realization of this constructedness of the self eventually leads us to question how truly unified our self-conscious awareness is. We see a glimmer of this in H. M.'s case, for if his procedural learning is unconscious, in what sense is it truly *he* that is doing the learning? Is it H. M. that is learning, or is it his body?

Such a question emerges in a more prosaic form in the case of hypnosis. Usually classified as a parlor trick and tarnished by long association with such pseudoscientific practices as mesmerism and past-life regression, hypnosis is nevertheless a real phenomenon. Individuals in a hypnotic state appear for all practical purposes to lose consciousness. But if it is not the conscious self that is responding to hypnosis, who is answering the hypnotist's questions? The perplexity returns after the subject recovers from the hypnotic state. During the hypnotic state an individual may be given a task to perform after reawakening, such as to open the window immediately after hearing someone cough. Such suggestibility makes hypnotism a fun parlor trick. What is psychologically interesting, however, is not only that the individual has no memory of the suggestion planted by the hypnotist but that, if asked to explain why she opened the window, an alternative explanation ("It's too warm in here!") is readily and unself-consciously given. The conscious mind seems quite willing to confabulate (make up) an explanation that is perfectly consistent with the action performed but at odds with what the observer perceives to be the real motivation for the deed.

The impact of such behavior has been blunted by both its familiarity and the frequent suspicion that there should be a simple and straightforward explanation available. Similar kinds of disassociation between conscious intentionality and behavior have emerged in other contexts. One of the most famous emerged from the research of Roger Sperry and Michael Gazzaniga with epileptic patients who had undergone a commissurotomy, a splitting of the cerebral hemispheres. In a normal human brain the cerebral hemispheres are connected by a dense neural structure called the corpus callosum. Beginning in the 1940s, severing the corpus callosum began to be used as a last resort to treat severe cases of epilepsy. Separating the hemispheres prevented the development of grand mal seizures that affected the whole brain, and the procedure proved to be a clinical success.

While patients could by and large function normally after the surgery, later experiments began to suggest that the severing of brain hemispheres resulted not only in a split brain but also in a split mind. These experiments capitalized on the separation of function,[4] the fact that each hemisphere is responsible for most bodily functions on the opposite side of the body: the left hemisphere controls movement and hearing on the right side of the body as well as the right half of the visual field of each eye, and

the right hemisphere controls movement and hearing on the left, as well as the left half of the visual field. Requiring the subjects to stare at a central point in front of them, material was shown to the left and right portions of the visual field in such a way that it would not be present to the other half. Because language skills reside largely in the left hemisphere, any verbal response to a question would represent what the left hemisphere "saw." If the patient was asked to respond by pointing with the left hand, however, this could be understood as a response from the right hemisphere.

Surprisingly, when the two hemispheres were simultaneously shown different material, their responses were indeed different and appropriate to the information that each hemisphere alone would perceive. In one such series of experiments, researchers flashed composite faces before their subjects, in which the left half of the face (for instance) would be that of a man and the right half that of a woman (Levy, Travarthen, and Sperry 1972). When subjects replied verbally, they claimed to have seen a woman's face. When asked to point with their left hand (controlled by the right hemisphere), subjects instead pointed to the man's face. Even stranger, verbal responses indicated that the subject had seen the entire woman's face (both left and right halves), even though only one half was presented. Somehow, it appears, processes in the brain fill out the image in a way that is undetectable to the verbal self.

Another sort of confusion arose in other experiments. If the written command "Laugh" was flashed before the left visual field controlled by the right hemisphere, the subject would laugh. If asked to explain the behavior verbally (thus involving the left hemisphere), the subject would respond with a comment along the lines of "You guys come up and test us every month; what a way to make a living!" Similarly, if the command "Walk" was flashed, the subject often would get up and do so, giving an explanation for the behavior that seemed to be at odds with the actual cause. Patients shown frightening scenes became agitated, whereas those shown calming scenes, such as ocean waves, became serene—all the while invoking, if asked, causes other than those of the slides (Gazzaniga 1988).

This kind of confabulation was present across a range of experiments. But what do these results mean? The most straightforward interpretation would seem to be that after the surgery there are two persons present, one in each hemisphere. Each hemisphere seems to be able to understand the tasks asked of it and respond accordingly. Each hemisphere possesses distinctive functions, the left clearly better at language and the right at spatial abilities. Each hemisphere seems oblivious to the perceptions and motivations of the other. The implications of this conclusion seem bizarre. Am I one person who, if my hemispheres were split, would become two? Or am I two people all along and just have never realized that what I thought of as my body is not really *my* body after all but *our* body? This last conclusion

seems odd both philosophically and scientifically. What biological function could such a duality serve?

Because these experiments touch at the core of human identity, they have attracted considerable philosophical attention and thus a range of explanations. In some ways, functionalist, information-processing accounts seem best able to explain the results of the experiments despite their weakness in accounting for the problem of consciousness generally. On a functionalist account, the conscious self is a product of the activity of the whole brain. When the brain becomes divided, the self does as well. Where there was one person there are now two, albeit with truncated abilities. Because consciousness and personhood are not any one thing but a property of the overall system, there is no point in wringing one's hands over which self of the split brain is the real one, for it presumes a kind of continuity and identity that does not exist.

Daniel Dennett has put forth one of the more radical solutions to this problem, arguing that the mind is made up of a number of competing modules, each vying to become part of the master narrative that is consciousness. In this model, the mind is characterized more by its plurality than by its unity. In the end, the conscious self is understood largely as an epiphenomenon, a continually modified central narrative that is constantly shifting as lower-level modules compete to update and revise the narrative that make up the whole person. As such, it is certainly conceivable for a second center of narrative gravity to emerge under the right conditions (Dennett 1991). Similarly, Patricia Churchland (1986) argues that the results show the inadequacy of such folk-psychological terms as *consciousness*, *self*, and *person*—terms that do not denote real entities but are used only because we are so ignorant of how the mind actually works.

Others are not so willing to give up the idea of basic unity. Neuroscientist John Eccles, defending a dualist position, has argued that the experiments provide evidence that the conscious self is housed only in the language-rich left hemisphere. While the right hemisphere can occasionally show remarkable ability, there is "nobody there," and, consequently, it may be considered as a sort of independent automaton (Popper and Eccles 1977). Critics point out also that the results of the experiments are more complex than is usually indicated in popular accounts. Only a minority of the patients made any response when information was flashed to the right hemisphere alone; most made no response at all. Moreover, although direct connection between the cerebral hemispheres was severed, the hemispheres retained indirect connections via the brain stem and other areas. These and other complications make it difficult to say whether there are suddenly one or two selves in the brain. What can be said is that in some of these cases a fairly developed and strong level of disassociative behavior is displayed, even though the meaning and implication of such disassociation remains unclear.

This kind of disassociation, where either the unity of the person is called into question or the conscious mind seems prone to fabricate information when it no longer has proper access, is not unique to split-brain cases. Blind sight is a similarly intriguing case. Evidence for blind sight emerged from patients who had suffered significant damage to a portion of their occipital cortex, which is significantly responsible for visual processing. Such damage typically results in a large blind patch in the visual field, with patients suffering damage on the right hemisphere of the cortex unable to see objects on the left, and vice versa. Experiments led by Lawrence Weiskrantz (1986) established that, even though patients insisted that they could not see objects in their blinded area, they could nevertheless guess fairly accurately what was there. Thus, if patients were asked to guess whether a square or circle was present in the blind spot, they responded at a rate consistently better than chance. How do they know? The implication seems to be that visual processing and information occurs at several levels and in different brain locations. Some of these locations are responsible for the visual field that we consciously perceive. Others are capable of providing limited information but seem to be only indirectly accessible to consciousness. If I experience blind sight, *who* "sees" the square in the blinded area? I do, but only in a sense that goes beyond what I regularly think of as my conscious experience.

Even more unusual than blind sight are cases of anosognosia, also known as hemineglect, which typically occurs as a result of a stroke that impairs the right parietal lobe. Patients who suffer this sort of damage are suddenly unable to acknowledge anything that appears on the left side of their visual field. Sufferers will shave only on the right, dress only on the right, and eat only off the right half of a plate. The left half of the body remains paralyzed and, for the sufferer, is essentially nonexistent. If a sufferer of anosognosia is asked to move his left arm or to get up and walk, he, like split-brain patients, will confabulate, claiming that he does not feel like moving his arm or going for a walk right now. In some cases, the denial is even stronger, with subjects claiming that the limbs on the left side of their body do not even belong to them. In one extreme case reported by Oliver Sacks, a patient kept falling out of bed because, he claimed, someone had put a corpse in bed with him and he kept trying to push it off the bed. When he pushed the corpse off, however, he fell, too—for it was his own unrecognized arm that he was trying to push off (Ramachandran and Blakeslee 1998, 143).

What is unusual about anosognosia is not merely the fragmentation of the unified person or the confabulations that patients produce. It is the quite specific derangement of rational thought that seems to accompany it. How could people not know that they are totally unaware of the entire left side of their body and visual field? It is not only the fact that sufferers

of anosognosia have lost all representation of what happens on their left side but that they are oblivious that such a deficit exists.

V. S. Ramachandran argues that such deficits should not be understood merely as a form of neglect but that they reveal a particular impairment of reasoning. Building on a theory proposed by Marcel Mesulam, Ramachandran proposes that our left and right hemispheres are responsible for different kinds of rational operations (Ramachandran and Blakeslee 1998, chaps. 6, 7). Whereas the left hemisphere is responsible for more focused attention, the right is responsible for detecting global coherence and anomalies. When this area in the right hemisphere is damaged, the left hemisphere is left to its own devices. Unable to detect anomalies such as paralysis on the left side, it constructs a world in which such paralysis does not exist.

Ramachandran's theory needs further elaboration and analysis. What is clear from research on anosognosia, blind sight, and split-brain subjects is how much the self is a construction of a number of quite special abilities. The ease with which we perceive and act in the world is the result of many complex, interacting brain systems. More than this, my self is significantly shaped and defined by these interacting systems. When some are impaired, who I am may be radically changed in the process.

Whereas brain damage may reveal in rather dramatic ways our own constructedness, it should not be altogether surprising, for our own development from fetus through childhood to adulthood reveals the extent to which we are not born as whole and ready-made but are made up as we go along. Advances in neuroscience and developmental psychology have only accentuated what we already know on a personal level. Earlier generations of psychology placed great emphasis on the role the environment plays in psychological development; modern research indicates that childhood development is a complex interplay of biology and external stimuli. Throughout much of childhood, the brain is a work in progress. Not only are we born with virtually all of the neurons we will ever have, we are born with far more than we will keep. In the first years of childhood, brain development is characterized by massive neuronal death as the brain essentially wires and programs itself as the child interacts with the world. Far from being a bad thing, such die-offs are a necessary part of brain development. A child's brain can be understood as a massive evolutionary project. Mental development is also very much physical development.

Such findings accentuate the question, Who am I? Am I merely the conscious flow of experience? Or does the self include the various sophisticated, unconscious cognitive processes that often are hidden from my conscious ponderings? It is questionable whether we can even make the distinction so clear-cut. What appears to be the case is that the *I*, the self, the person, is a kind of ongoing process, developing across time and emerging as a result of a large number of brain and body processes. The relation of self and body resembles more a surfer on the sea than a ship and its

captain. A surfer can exert control on his or her direction, but it must always be done with a sensitive awareness to the actions of the water beneath. But even this metaphor is misleading, for it presumes that the surfing self and the sea of brain and body can be treated as completely separate entities. As cases such as anosognosia indicate, such separation is illusory. The *I* is itself composed of brain processes of which it is totally unaware.

Painful Pleasures: The Paradox of Emotion

Although we often feel in control of our thoughts and actions, such confidence frequently melts with respect to our own emotional states. On occasion, I am confronted in class with the eager libertarian student who claims to be completely free and in charge of himself or herself. On those occasions, I sometimes command the student, "Be happy!" or "Be mournful!" or "Fall in love!" Of course, it's impossible. It seems paradoxical, but the thing we have least control over is our own emotional state. I can no more *make* myself be happy than I can move a mountain. As a result, we all engage in elaborate behavioral patterns that, in one way or another, are designed to produce happiness and a sense of well-being and avoid pain and sorrow. It is going to dinner and a movie with friends and family that makes me happy, not any direct willing of the state of happiness on my own part.

This lack of control also seems paradoxical because our emotional states, more than anything else, are important to us. Human beings will do almost anything to achieve happiness and avoid pain and suffering. Our lives are defined in no small part by the fact that states of well-being are often so difficult to achieve on a regular basis. Early to bed and early to rise may indeed make one healthy, wealthy, and wise, but there is no guarantee that health, wealth, and wisdom consistently produce happiness. Indeed, the many celebrity biographies in books and on television suggest that, while wealth can make life easier, it does not guarantee happiness. And even though many reply on national surveys that they are content or happy, such sense of well-being stops short of the peak experiences that especially drive us and that tragically lead many to drug use.

Because emotions are intimately tied to our goals and aspirations, they are important theologically. It would be a mistake to reduce categories of salvation to emotional states, but it also would be a mistake to conclude that emotions are unimportant for our understanding of salvific states. Emotions define in no small way both what we wish to avoid and what we seek. There is much suffering in Dante's vision of hell, whereas eternal bliss awaits those who pass into the heavenly realms. Consequently, emotional states contribute to our freedom in the soteriological sense. Negative emotional states hinder our ability to achieve our desired goals; positive ones enable us to achieve such goals and indeed are part of the goals themselves. It is thus not surprising that popular psychology plays such an

important role in modern society, for it serves as a kind of secularized soteriology, promising to help us achieve the happiness we so desire but consistently fail to attain.

Despite its importance, emotion remains one of the least understood features of the human mind. Part of the reason for this is the research perspective of both behaviorism and early cognitive science. Behaviorists limited psychology to the study of behavior. Because emotion seemed to be an internal, mental quality, its study tended to be excluded from the behaviorist paradigm or understood as a form of behavior. Early cognitive scientists also tended to ignore emotion. Cognitive science was understood to be the study of rational thought processes, of which emotion seemed to be the opposite. Computers do not emote. This by no means meant that human beings do not, only that emotion lay outside the scope of early cognitive science.

This lack of research stemmed in no small part from such methodological blinders. It also resulted from the fact that emotional states have proven to be extraordinarily difficult to study. A primary problem is simply defining what we mean by *emotion*. Emotional states can be said to include not only pain and joy but also love and depression, which are somewhat more abstract. I can be joyful for a few minutes or hours, but I may be depressed for months and in love for years. More than this, describing emotional states is tricky. Steven Pinker observes that our experience of emotions is much richer than the language we use to describe them. One result of this is that languages vary in their ability to capture emotional states. Only Germans have a term for pleasure at the pain of others (*Schadenfreude*), but upon hearing it explained we instantly recognize what is being conveyed (Pinker 1997, 367). This primal quality of emotions also seems to render nonsensical those who claim that all experiences can be understood as linguistic constructs. Only a fool would trade the experience of love for a description of it.

Despite this lack of concern during much of the twentieth century, the importance of emotional life has prevented it from being totally neglected, and as our knowledge of the brain and mind has progressed it has become increasingly apparent how important emotion is to the proper functioning of the human self. This progress, in turn, has led to the development and discarding of a number of theories of what emotions are and how they work. Many current cognitive scientists trace the beginning of emotion research to William James (1884), who postulated that emotions arise out of bodily states. The reason we feel fear upon seeing a bear, for instance, is that we suddenly undergo significant bodily changes. Our heart begins to race, our breathing quickens, and, in most cases, we run. James saw emotion arising out of the interplay of mind and body, with the body bearing the causal responsibility.

James's approach eventually came under criticism, and exploration of emotions went primarily in two directions. Cognitive psychologists came to understand emotion primarily in terms of cognitive function. Early theorists proposed that emotion served as a kind of appraisal system that evaluated experiences. The link to the body was kept, but the cognitive role of emotions was emphasized (Schacter and Singer 1962). Pinker, a contemporary example of this functionalist approach, understands emotions primarily in terms of evolutionary function. We have emotions because they help us survive, and they help us survive by urging goals and priorities upon us. The person who stands in front of an angry bear deciding between alternatives will likely perish; the person who runs in terror has at least a chance of surviving (Pinker 1997). Disgust functions to help us avoid foods that are poisonous, lust makes sure that our genes do not die with us, and our love for our children ensures their survival into adulthood. For Pinker and other functionalists, emotions serve as a kind of brain within the brain, orienting our goals and desires relatively independently of our conscious self.

While cognitive psychologists were developing functionalist accounts of emotion, neuroscientists were, not surprisingly, attempting to understand the brain structures involved. Early on, the most influential model was that of Paul MacLean's triune brain (1970). MacLean understood the brain as a kind of evolutionary layer cake, with different brain structures identified with reptilian, mammalian, and distinctly human stages of development. In his analysis, the oldest areas of the brain derived from early reptiles. This reptilian brain was responsible for those most basic of emotions tied to survival: fight, flight, food, and sex. Because mammals need to cooperate in large groups and nurture their young, portions of the mammalian brain developed to promote such prosocial behavior. The areas responsible for emotion came to be called the limbic system and involved the amygdala, the hippocampus, and surrounding brain regions. MacLean's claims regarding the existence of a limbic system were partially borne out by a number of experiments. For example, epileptics who suffered seizures in the area of the limbic system experienced intense emotional sensations.

Recent work on emotion has begun to integrate psychological and neurological approaches and has revealed a more complex picture than is portrayed by either approach alone. Emotions do appear to be universal rather than culture-specific, although the expression of emotions depends heavily on cultural circumstances. Paul Ekman (1980) has proposed that there are six basic emotions that we all share and that are tied to specific kinds of facial expressions. Regardless of culture, individuals can differentiate between facial expressions of surprise, happiness, anger, fear, disgust, and sadness. Thus, Japanese individuals watching a film will display the same emotional range as Americans, although their display depends on whether or not other people are present.

Our emotional responses, in turn, are mediated by a number of brain structures, some of which occur in the area traditionally denoted as the limbic system. Work by Joseph LeDoux, in particular (1996), has highlighted the role that the amygdala plays in fear responses. LeDoux built on work that indicated that damage to the amygdala and surrounding regions leads to impairment of fear conditioning, and his research revealed the complexities involved in even this most basic of emotional responses. The importance of the amygdala for fear, however, does not extend to other emotions, and LeDoux argues that the limbic-system model for emotion is too simplistic. Emotion is more complex and likely involves several regions of the brain.

The complexity of emotion and its integration with other cognitive processes is revealed in the work of Antonio and Hanna Damasio. Their work has focused on the role that emotion plays in reasoning processes, highlighted by what is now the famous case of Phineas Gage. Gage, a nineteenth-century railroad foreman, suffered a devastating brain injury when a dynamite blast propelled an iron spike up through his cheekbone and forebrain and out through the top of his skull. To the astonishment of all, not only did Gage survive, he could still communicate and, after a short while, was able to move under his own power. Yet it eventually became apparent that something dramatic had happened. Formerly, Gage was one of the best and most trusted workers in the company. After the accident he became unreliable and unpredictable. Once of good character, he now used profanity with such indiscretion that women were advised to stay away from him lest they be offended. No longer able to keep a steady job, he drifted from employer to employer until he ended up in a carnival freak show and finally died destitute and unemployed. Gage's reasoning faculties seemed fully intact, but his personality had wholly changed. In the eyes of his friends and acquaintances from before the accident, "Gage was no longer Gage" (Damasio 1994, 8).

Gage's skull and the tamping iron that caused the injury were preserved at the Harvard School of Medicine, and research by the Damasios found that the blast caused significant injury to the prefrontal cortex at the very front of the brain. Today, patients who suffer damage in the same area exhibit conditions very similar to Gage's. These patients seem able to reason in a perfectly normal fashion, typically retaining average or above-average functioning on standard intelligence tests. Experiments also show that their moral reasoning is sound as well; patients can distinguish between socially accepted norms of right and wrong and, if given a list of alternative scenarios, can identify which sort of behavior is appropriate and explain why.

Strangely, however, these patients cannot consistently apply their perfectly sound reasoning abilities to decisions in their own lives. They typically have lost their jobs because of their inability to perform in a dependable

and predictable manner. After their injury, spouse and friends find them difficult to get along with, prone to unpredictable outbursts and socially inappropriate comments. Antonio Damasio has found that these patients also seem to suffer from an almost total lack of affect. Except for the occasional outburst of short duration, patients display a lack of emotional attachment. One patient even complained that things that once inspired him now no longer did so. Typically, sexual drive is lost as well.

Research by Damasio and his colleagues suggests that the two deficits are in fact linked: poor decision making is in no small part a result of being unable to attach emotional significance to events and proposed alternatives. Effective decision making requires what Damasio calls "somatic markers." Our reasoning by itself is unable to make us *do* anything. Reasoning processes must also be connected to an emotional evaluation. In a series of experiments, this was demonstrated by having normal subjects and subjects with prefrontal cortex damage play a kind of gambling game. Subjects were allowed to select from four decks of cards. Drawing a card from any given deck resulted in either a monetary (play money) reward or punishment. Some decks gave on average better rewards than others, but the subjects were not told this beforehand. Over the course of playing the game, normal subjects learned fairly quickly to draw from the decks that rewarded better, and skin-conductance responses (used in lie-detection tests and usually a reliable indicator of emotional arousal) indicated that they developed a learned emotional response to drawing from the decks that punished most severely. Subjects with prefrontal cortex damage showed immediate emotional responses to reward and punishment, but they failed to demonstrate the kind of learned emotional response that normal subjects did. Consequently, the brain-damaged subjects performed quite poorly and quickly drove themselves into "debt."

Damasio's work with these subjects is remarkable for the way that it integrates emotion and reasoning and connects them in turn to bodily states, much as James did more than a century before. Emotion is not simply an add-on component, an epiphenomenon on top of rational processing. It is integral to the proper functioning not only of the organism as a whole but to basic rational decision making. Such research also shows, again, the extent to which our personhood is a construct and the extent to which it relies on the integration of body, brain, and mind. The impact of emotional disconnect is, if anything, even more profound. It is in some ways easier to acknowledge that our reasoning and perceptual abilities emerge from the constructs of the brain. While such abilities are indeed important to us, we do not generally consider them as central as emotional dispositions are for defining selfhood and personality. Emotions touch at the core of who we are. To lose most of our emotional associations, as subjects with prefrontal damage apparently do, seems virtually inconceivable and, to many, hellish.

But even this may not be as striking as how brain damage can cause such a complete change in personality. We prefer to think that our personality is to some extent under our own control. I may not be able to achieve happiness on command, but I can determine my own outlook on life and thereby exert control over the type of person I will be. If I have made a mess of my life, or if I suffered through a horrible childhood and grew up in a negative social environment, the power is within me to turn around. If only Hamlet had resolved to put away his infirmity of character, things might have been different. Shy, emotionally straitjacketed Laura in Tennessee Williams's *The Glass Menagerie* draws our pity at the same time as it evokes the thought within us, "I would not put up with that kind of life!"

But is the choice really ours to make? Persons with prefrontal damage indeed suffer a huge loss, but their subsequent behavior is not out of the realm of ordinary human experience. We know many who consistently have made poor choices and thus wasted their lives. To what extent is this simply a matter of choice, and to what extent is it a matter of biology? Was Phineas Gage free before the spike blew through his brain but less so afterward? In what sense was he responsible for his own decisions after the accident, and to what extent can they be blamed on the damage to his brain?

These questions have emerged in a quite different way with regard to our growing knowledge about the role that neurotransmitters play in brain functioning and particularly to the emergence of a significant pharmaceutical industry that modifies their production and absorption. When a typical neuron fires, it releases neurotransmitters at the axon, which then bind to receptor sites on the dendrite of the neighboring neuron. This binding creates an electric potential in the neighboring neuron, causing it to fire in turn. The neurotransmitters are then typically released and taken up again by the originally firing neuron. There are more than forty neurotransmitters in the brain—likely many more. Not all neurons respond to all neurotransmitters equally, and some neurotransmitters serve not to transmit as such but to encourage or inhibit transmission. Furthermore, neurotransmitters are produced only at certain sites in the brain, and the supply of neurotransmitters affects the rate and manner in which neurons fire.

The role of neurotransmitters in the brain is highly complex and in some ways one of the strangest features of brain functioning. Although the firing of a neuron often is compared to the binary state of a logic gate in a computer, there is no computational analog for neurotransmitters. This is not only because of the way that neurotransmitters affect the firing of neurons but also because of the way in which they connect the state of individual neurons to the global state of the organism. As is now well known, exercise can result in the release of endorphins. Endorphins affect neuron firing, which in turn can create an elevated mood, sometimes resulting in a "runner's high." Physical, cognitive, and emotional states af-

fect the release of neurotransmitters, which affects the firing of neurons and thus future physical, cognitive, and emotional states.

The connection between these comparatively simple molecules and our emotional states is, on the face of it, perplexing. It is not at all clear why their impact on neuron firing should affect us the way they do. That such chemicals do affect us in precisely this way, however, has been known, at least on a folk level, since the dawn of recorded history and likely before. Alcohol and drug use is hardly a modern phenomenon, and their mood-altering capacity has been used over the millennia for a variety of social and religious purposes. Psychoactive substances typically work by either mimicking neurotransmitters or inhibiting their proper functions in nerve transmission. That such substances can temporarily transform personality hardly needs mentioning.

Only recently have we begun to understand the role that natural neurotransmitters play in mental health and self-regulation. This has been brought to public attention particularly by the success of Prozac and similar drugs that work by blocking the re-uptake of the neurotransmitter serotonin, effectively increasing the amount of it in the brain. Originally designed for such conditions as manic-depressive disorder, these drugs have also been widely used to treat clinical depression, sometimes with striking effect. In many cases, not only does the drug cure the depression, but patients experience a subtle but significant shift in their personalities. As observed by clinical psychiatrist Peter Kramer in *Listening to Prozac* (1993), such patients sometimes describe themselves as "better than well." Individuals who have struggled all through life with shyness or low self-esteem find themselves for the first time willing to be active in social situations and take risks. Marital and sexual relationships are transformed as individuals marvel at what they had been willing to put up with. Prozac users sometimes find themselves more successful at work as well. In the eyes of some, Prozac and thereby serotonin seemed a kind of cure-all, all the more because it was not thought to be addictive and usually did not have any significant side effects.

Such exuberance has sometimes given drugs a bad name. They do not work equally well for everyone or in all contexts. Indeed, they seemed most effective with what Kramer calls "penumbra" patients, those borderline cases who are not clearly clinically ill. Although such accounts are anecdotal, the effect seems to be real, and troublingly so. It seems strange that a single chemical could have such a global effect on personality. Is changing personality really as simple as taking a pill? Are we entering, frets Kramer, a new era of cosmetic pharmacology, when we can use drugs to change our personality if we do not like the one that we have?

These concerns are perhaps overwrought, at least so far. However, as with the case of Phineas Gage, they do reveal the extent to which the criteria by which we define who we are are affected by the mechanisms of the

brain and biology. More than this, the ability of fairly simple chemicals to alter our sense of well-being touches on the issue of soteriological freedom discussed earlier. A significant element of the Christian tradition has been the promise of personal transformation. The fullness of Christ's love is not something that is postponed until the afterlife but is, at least to some extent, experienced now. In the months leading to his conversion, Augustine experienced considerable pain, confusion, and internal turmoil. Afterward, these disappeared. Confident in the promise of God's grace, Augustine seems to have never looked back. Newly assured and transformed, he thereafter led a celibate life and assumed significant leadership in the church.

Would Augustine's spiritual crisis have been better dealt with by taking a pill? Hardly. Although serious consideration of our biology may give us pause, brain chemistry alone does not eliminate anguish or set our priorities in life. But Augustine's sense of well-being after his conversion cannot be understood as only a spiritual change but not a physical and biological one, for the simple reason that such neat divisions no longer make sense. Our spirit, however we may define that, emerges out of the activities of the mind/brain, which in turn are intimately connected to the body. A spiritual transformation, therefore, is also in some sense a biological one. Soteriology must therefore include the whole person. This would seem to imply that, while salvation is not limited to brain chemistry, any full concept of salvation must include it.

This seems like a strange thing to say. The sphere of religion is usually understood as separate from and above other considerations. Human biology belongs to medical doctors, psychology belongs to psychologists, and spirit is the province of pastors and theologians. Such a hierarchy presumes that these separate levels are independent of one another. They are not. This has significant implications for soteriology. If theological claims about personal transformation are correct, any account of mental health that relies on psychological categories alone is incomplete, for mental health must include the whole person, which presumably includes the kind of spiritual orientation that participation in a life of faith implies. Likewise, theological claims about soteriology are incomplete unless they take the whole person—body, brain, and all—into account. A religious transformation is also a psychological transformation and a biological one.

This may seem a novel and foreign idea, but perhaps it is not. The ministry of Jesus was notable as much for his healings as for his teachings. The coming of the kingdom of God involved not only a spiritual transformation but in many ways also a physical one. While two millennia and countless technical achievements separate us from the time of the Gospels, it appears that in some cases old insights still can surprise.

Constrained to Be Free

Are we free? The question is deceptively simple, for freedom implies many things. To be free implies that there is someone, a subject, who can act on that freedom. Cognitive science does not deny such a subject, but it does show that the kind of freedom we have is dependent on the complexities of our mind/brain. These are revealed startlingly by extreme forms of brain damage but also in our still-limited understanding of our emotional lives. Such complexity suggests that the kind of freedom we have is itself complex. It is not simply a matter of whether we can do anything or nothing but of what we are enabled to do.

For some, this may not seem to answer the question directly. Freedom, in the metaphysical sense, is opposed to determinism. In asking whether we are free, the metaphysical theologian wants to know whether my actions are fully determined by my environment or whether they in some sense originate from inside myself. If a person turns to a life of crime, is it as a result of personal choice, environment, or neural chemistry?

Freedom in this sense can take us beyond the cognitive sciences and, indeed, beyond the realm of the sciences altogether. The sciences by themselves cannot tell us whether the world is fully deterministic. Dominant interpretations of quantum physics in fact suggest that it is not; the world has some indeterminism built in, even though in most physical processes this indeterminism largely disappears at the level of living organisms. But even here there is always the gap between empirical evidence and ultimate claim. One can interpret the physics differently, as unlikely as that now seems to many.

One might do better to draw a contrast between ourselves and our immediate environment. Environmental determinism seems quite difficult to sustain, and our current understanding of cognitive science does little to support it. Behaviorist psychology presupposed environmental determinism and foundered precisely because it provided no straightforward way to account for complex human behavior. Our environment conditions and constrains us more than we probably realize. But the sheer complexity of the human mind and the logic of its internal workings render meaningless any environmentally deterministic position. For any given environmental input there typically are many behavioral outputs, because the actions we take depend crucially on our own history and personality.

One might go further and observe that our behavior is significantly constrained by our genes and by the particular wiring and architecture of our brain. Indeed, many of the experiments cited above are sometimes taken to support just this point. But such observations work only if we assume that these features of my biology are separate from the "me" that decides. This line of thought falls into the trap of assuming that "I" am separate from my body and brain in such a way that I can say that it is my

brain doing the action, not I. But it is precisely my body and brain that are integral to my normal functioning. It is as if a follower of Descartes said that I am not free because all of my actions are fully determined by the proper functioning of my soul. Because my soul determines everything I do, I must not be free. Such an argument makes the mistake of assuming that, in a Cartesian dualist framework, the soul and "I" are distinct and separate things.

Owen Flanagan observes that this kind of mistake is frequently made with a famous experiment conducted by Benjamin Libet (Flanagan 1992; Libet 1985). In the experiment, Libet had individuals watch a clock as they flexed a finger. The subjects were asked to occasionally flex their fingers and to observe on the clock the precise moment at which they decided to do this. At the same time, Libet had the individuals hooked up to an electroencephalograph that measured brain wave patterns and, in particular, a pattern that Libet designated the "readiness potential" that indicated the onset of an action. Libet found that the conscious intent to flex the finger took place approximately 200 milliseconds before the actual flexing, but the readiness potential registered at about 350 milliseconds prior to the conscious willing. The implication seemed to be that the conscious willing is the result of a prior unconscious process, making the conscious intent causally inert.

While the experimental setup does allow differences of interpretation, Flanagan notes that the conscious mind can be considered causally inert only if one presumes no prior history to the experimental setup. In order for the experiment to proceed, however, subjects had to previously agree to do the experiment and, presumably consciously, listen to and understand the instructions given to make the experiment work. The mistake is to separate consciousness from the rest of the person and its history; when this is taken into account, the simple claim for determinism and the irrelevance of consciousness becomes harder to make.

In many ways it is the very determinate structure of our brain and biology that enables the kind of freedom we do have. This may not get us fully to a metaphysical freedom, but it is at least empirically consistent with it, which is the most we can ask from the sciences on such an issue. It also suggests that our freedom is developed out of quite specific kinds of constraints. Human beings are, for instance, quite good at recognizing and remembering faces, and certain kinds of brain damage can result in prosopagnosia, the inability to recognize individual faces while otherwise being visually unimpaired. We do not remember names as well, however, and most of us are familiar with recognizing the face but forgetting the name—only rarely is it the reverse! Our ability to recognize and remember faces provides a degree of freedom and is important in social communication and relationships. Language provides another degree of freedom. The ability to empathize and to think about one's thoughts (an ability that

individuals with some forms of autism may lack) provides another (Baron-Cohen 1997).

We are, then, both bound and free, and it is because of the particular form of our bondage that we have the kind of freedom that we do. Such an observation by itself does not resolve the Luther-Erasmus debate, in part because their understandings of freedom were so profoundly different. But it might provide a starting point for considering the issue afresh. Metaphysically, one can at least affirm our own empirical freedom, a freedom that means that the self is not simply a product of its environment but is formed by its own decisions and choices. At the same time, our freedom is enabled by the particular, embodied constructive character of our mind/brain/body. Almost paradoxically, we are empowered by our limitations. Out of this comes the need for soteriology. Luther argued that our nature is so bound that we are unable on our own to truly will the good. For him, true freedom meant a transformation brought about by Christ, which could be achieved only through God's action. Here, theological claims transcend what can be ascertained by cognitive science, but the border between the two can be significant. Cognitive science cannot speak of the true freedom that Luther and so many of us seek, but it can at least remind us that such freedom is not merely a freedom of the mind but of the whole person. Recognizing this can correct what has sometimes been an escapist trajectory in the Christian tradition as well as provide new insights into the kinds of freedom worth having.

Notes

1. The treatises by Luther and Erasmus are reprinted in Rupp, Watson, and McNeil 1995.
2. Antonio Damasio (1999) uses the terms *core* and *extended consciousness*. Gerald Edelman (1992) distinguishes between primary and extended consciousness, but the meanings are essentially the same.
3. H. M.'s case has been extensively studied and analyzed in the psychological and neuroscientific literature. Cf. LeDoux 1996.
4. This research has been reviewed in numerous places. See, for example, Gazzaniga and LeDoux 1978; Churchland 1986, 172–93.

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FREEDOM IN THE BODY: THE PHYSICAL, THE CAUSAL, AND THE POSSIBILITY OF CHOICE

by Michael L. Spezio

Abstract. In *Minding God* Gregory Peterson takes a careful look at the kind of freedom that human persons have. He concludes that humans are constrained to be free and unpacks this into a version of compatibilism. That is, humans are not metaphysically free under current existence because of the causal determination inherent in their physical nature, but they can take credit for the origination of self-forming decisions because the causes occur inside of us. Peterson does advocate an eschatological hope looking forward to the breaking of causal determination by God's own action. Thus, *Minding God* presents an eschatologically limited compatibilism. Compatibilism of any kind, however, presents serious challenges to most Christian theologies and to many religious traditions broadly considered. After I interpret Peterson's position I make the argument that compatibilism is neither desirable nor required for a theological anthropology intent on serious engagement of cognitive science.

Keywords: Karl Barth; cognitive science; incompatibilism; William James; neuroscience; relational; subjective.

When a human being decides, is there a possibility of choice or only a complex working out of mechanism, involving only the causal interactions of a physical, embodied self and its permeating, equally physical context? In *Minding God* (2003), a rich engagement of cognitive science[1] from a perspective within Christian theology, Gregory Peterson takes up human freedom as a central theme in the dialogue between Christian theology and cognitive science. Peterson is right to focus on this key issue, since human freedom and its limits are central elements of nearly every Christian theology and of most other major religious traditions as well.

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Peterson concludes that humans are "constrained to be free" (Peterson 2003, 95) and endorses a form of compatibilism,[2] creating major challenges for any Christian theology and theodicy whose coherence depends on the possibility of human choice.

In what follows I frame an overview of what I interpret to be Peterson's view of human freedom in *Minding God* and his reasons for holding this view. First I briefly review accounts of human freedom. I then argue that Peterson holds an eschatologically limited compatibilism that accepts and celebrates a fully causally determined human nature, understood in physical terms, but remains committed to the hope of breaking determinism's hold. Freedom is still to come, in an eschatological age, glimpsed as yet only with the eyes of hope, grounded in a living faith. I argue in response that compatibilism of any kind is neither desirable nor required for serious[3] engagement of religion with science. I agree with Peterson that humans are constrained to be free, but we make more progress by exploring meanings of constrained freedom other than compatibilism. Doing so requires recognizing the constraints that our own interests place upon the kinds of answers we find in any given inquiry and recognizing also how limited in scope each one of these interests is. It is these moments of recognition that make possible the moments of freedom we enjoy. Such recognition requires of us a full embrace of human experience in all three "persons" (the subjective I, the relational You, and the distanced She/He) and so is one way in which we are constrained to be free.

Most people agree that human freedom requires the possibility to "select between alternatives without coercion" (Peterson 2003, 75). Decisions can be made under various kinds of compulsion. For a decision to be a choice, though, the deciding agent must be free of compulsion. Compatibilists deny that causal determination of decisions counts as compulsion when that causal determination physically arises within a deciding agent. They thus say that freedom is compatible with a human nature that is causally determined from within. Incompatibilists define any causal determination of a deciding agent as compulsion and say that freedom is incompatible with a human nature that is causally determined.

Note that both compatibilists and incompatibilists affirm that freedom requires an agent to be "ultimately responsible" for and the originator of her decisions (Taylor and Dennett 2002, 257–59, 273; Kane 1998, 60–61). Compatibilists find that affirming ultimate responsibility just is "the knowledge that without our presence, the universe would have turned out significantly different" (Taylor and Dennett 2002, 273). Incompatibilists find that the same may be said for anything that exists, including things not generally viewed as deciding agents, such as volcanoes and rivers. Most compatibilists are convinced that human nature is causally determined. So are some incompatibilists, and these deny that human freedom exists,

although some argue that we must live under the illusion of freedom to live at all morally (Pereboom 2002; Smilansky 2002). Many incompatibilists, however, deny that human nature is causally determined—or deny that we *know* that it is—and attempt to construct accounts of human nature that allow for the possibility of choice, as they understand it. They are motivated by certain compelling elements in human experience: (1) the experience of freedom in the first person (in subjective experience) that is widely shared among human persons and (2) the attribution of freedom to the second person (the relational You), which is based on similar widely shared experiences and which is required for understanding moral agency and responsibility.

Peterson doubts whether metaphysical freedom—decision without causal determination—is possible at all for embodied humans: "In many ways it is the very determinate structure of our brain and biology that determines the kind of freedom we have. This may not get us fully to a metaphysical freedom, but it is at least empirically consistent with it" (Peterson 2003, 97). The "empirical freedom" Peterson affirms "means that the self is not simply a product of its environment but is formed by its own decisions and choices" (p. 97). Here, determinate structure is squared with choices, and we see an affirmation that the kind of freedom that counts is one in which the self originates from its own decisions. This position is textbook compatibilism, and it is one way in which Peterson understands humans as constrained to be free.

Expanding on this view, Peterson understands human freedom as the causally determined complexity and plasticity of human nature. He writes, "The great plasticity of our behavior allows us to act selfishly, to cooperate, and even to cooperate selfishly. Yet our freedom is not complete, and all too often we find ourselves constrained by both biology and culture. . . ." Human capacities for empathy, facial recognition, and other social and relational abilities provide "a degree of freedom." These capacities are "the particular form of our bondage" that allows us to "have the kind of freedom that we do" (p. 97). Here, Peterson celebrates the wondrous complexity of a thoroughly physical human nature, especially complexity that enables relationship, calls this complexity freedom, and embraces its thoroughly mechanistic, causally determined nature.

Peterson rejects reductionism and any type of eliminative materialism. He ultimately favors an open-system emergent physicalism (2003, 66–69). But open-system emergent physicalism leads to an embrace of scientific causal mechanism just as surely as reductionism does. As Jaegwon Kim makes clear in his recent *Mind in a Physical World* (2000, 120), "To think that one can be a serious physicalist and at the same time enjoy the company of things and phenomena that are nonphysical . . . is an idle dream." Philip Clayton alludes to this problem in his work (1999, 212)

and stops short of avowing physicalism. An open-system emergent physicalism that affirms only a causally determined human nature, as Peterson's does, entails compatibilism.

Compatibilism is not, however, Peterson's final answer to the problem of human freedom. He affirms a second way in which humans are constrained to be free, in answer to the second of two theological questions about human freedom. While compatibilism answers only the first, philosophical, question, the second asks about what happens when "all possibility of mind will cease," about transcending the "travails of our current existence." It is answered by putting "faith in the claim that God will make such a transformation possible." A "logic of hope" then arises, beyond any science, hope in "a God who minds, both for our future, and for us now." The compatibilism required for our current, determined existence has no place in the eschaton of hope. There, determinism's hold is broken, and we will be truly free. In this way, theology recognizes a freedom that is entirely about "entering a new state of being," about "freedom from sin and the evils of this world" (Peterson 2003, 221).

Peterson's eschatologically limited compatibilism allows theology to enjoy strong coherence with cognitive science while affirming an important role for theology in systematically reinterpreting sacred narrative and tradition within a strongly eschatological framework. Nevertheless, compatibilism raises difficult challenges for most Christian theologies, especially those whose coherence depends on the possibility of human choice, free of any compulsion including causal determination, within the constraints of our current existence.[4] Thus, compatibilism is not a desired element of theological engagement of cognitive science, at least from the viewpoints of most Christian theologies.

One option Peterson might have used to avoid a compatibilist view is to incorporate quantum physics into his physicalism, specifically the indeterministic interpretation of wave collapse. Indeed, B. Alan Wallace has chided cognitive science for not taking quantum physics more seriously: "To discuss the mind/brain problem today without taking into account the implications of quantum theory is like discussing the movements of the planets without taking into account the Copernican Revolution" (Wallace 2000, 73). Yet Peterson excludes quantum indeterminacy because "there is no credible evidence" supporting a role for it in contemporary cognitive science (2003, 71).

Had Peterson tried to incorporate quantum indeterminacy, his might have been an incompatibilist view similar to the influential view of Robert Kane, who proposes that the "efforts of will" felt by agents making real choices can be described, from a scientific, physical viewpoint, as quantum indeterminacies in the brain amplified by chaotic systems also in the brain (Kane 1998, 128–30). Quantum processes free decisions by agents from causal determination. As examples, Kane describes a businesswoman late

for a crucial meeting who is rushing along and happens to be the only person to see a mugging underway in an alley; and an engineer who is an alcoholic and trying to rehabilitate his marriage, working late one night and tempted to have a drink. These persons are torn by the decisions facing them. Kane suggests that the tension up to and including the moment of choice is equally explicable in terms of subjective experience and quantum chaos in the brain. Kane is not a mind/body substance dualist, but neither is he a physicalist, since "the explanatory roles currently played by desires and beliefs, processes of reasoning, efforts, choices and distinctions between mental *actions* and mere happenings" are required "in the final accounting if free will is to survive" (Kane 1998, 147). In this way, Kane argues, quantum physics allows an account of human decision making that is free of causal determination and so allows for incompatibilism *and* the possibility of human freedom within a scientifically coherent worldview.

Nevertheless, Peterson is on solid (cognitive) scientific ground in doubting whether quantum events in the brain could be used to support causal indeterminacy. For one thing, Peterson recognizes, as Kane does not, that there are wholly deterministic accounts of quantum action at the macroscopic level that have not yet been ruled out (Albert 1992, 134–79; Greene 2004, 206–8). More important, Peterson also recognizes that contemporary quantum physics includes the relatively recently developed concept of quantum decoherence,[5] which severely curtails quantum strangeness at the macroscopic level (Peterson 2003, 68). Decoherence in the brain takes place on the time scale of 10^{-20} to 10^{-13} seconds (Tegmark 2000), faster than the gating of a single ion channel in the cell membrane (~10^{-13} seconds to 10^{-9} seconds) (Beckstein et al. 2003; Liebovitch and Krekora 2002) and much faster than the duration of a single action potential (~10^{-3} seconds). Although decoherence time scales are consistent with the view that *God* acts at the level of quantum indeterminacy (Russell 1998), the idea that finite *human* agents deliberate and choose at those scales is difficult to maintain.

Having seen that quantum physics offers slight hope to incompatibilists seeking support for the possibility of choice, we now ask whether there is an incompatibilist view that still allows theology to seriously engage cognitive science. Before answering in the affirmative, two central motifs that energize Peterson's theological engagement of cognitive science need to be considered, because they are both very important in any engagement of cognitive science by theology on the question of human nature. These elements are (1) conceptual coherence and (2) an ecological ethic demanding that humans be seen in ultimate connection with (nonhuman) nature and never separated from it. Both commitments lead Peterson to give cognitive science primary status in saying what human nature is and is not under current existence, which results in his empirically limited compatibilism.

For Peterson, the ideal scientific theology is a "rational enterprise" (2003, 15), because rationality is required for theology to "make claims about the world" (p. 16) without which theology is irrelevant. Rationality here is understood as Western scientific logic, with great value placed on coherence and parsimony. Ideal theologies are coherent and conservative systems of propositions and arguments, and the best among them seek the most coherence with the most accepted theories of cognitive science. Taking cognitive science seriously means constructing theologies that maximize coherence with contemporary cognitive science (p. 17). Peterson stops well short of endorsing an eventual synthesis of theology and cognitive science. Instead, incoherence will and probably must remain, despite the best efforts of those seeking to maximize it.

Granting the wondrous complexity of human-within-nonhuman nature, Peterson combines humility with a desire for new knowledge, saying that "the story of human nature . . . is incomplete both scientifically and theologically" (pp. 72–73). At the same time, he asserts that cognitive science can "explain on a naturalistic basis most, if not all, the functions of mind" and that there is "nearly incontrovertible" evidence that human subjective experience or consciousness emerges "naturally as the result of biological development" (p. 71). While "a strictly biological account of human nature must necessarily be incomplete" (p. 175), and while "cognitive science still offers only a rudimentary guide at best" to understanding human consciousness (p. 71), there is a strong tendency in Peterson's account to grant cognitive science the last word, or nearly so, in accounts of human nature. He goes so far as to recommend that anyone "outside of scientific research" maintain "a prudent agnosticism about the ultimate nature of consciousness" (p. 71).

Why this emphasis of science over all other forms of inquiry? One reason is the coherence-maximization function of an ideal, scientific theology. But the drive for coherence with cognitive science is motivated by a desire to counter theologies that cleave human nature in two. Not only do dualistic theologies generally lead to "the result that the mental becomes completely separate from the physical and therefore completely abstracted from the science as well" (p. 64); Christian dualism also privileges the mental, or soulful, aspect of human nature, devaluing human embodiment and nonhuman nature along with it. For Peterson, dualism leads to the bizarre claim that humans are "alone in an otherwise silent cosmos" and obscures the truth of a world that "places us amidst a plethora of intelligent and passionate creatures," a world that "the cognitive sciences are revealing to us" (p. 150). Peterson's ecologically ethical focus is a welcome one and motivates his desire for coherence between theology and cognitive science.

Both commitments discussed here—to conceptual coherence and to an ecological ethic—arise, at least implicitly, whenever theology engages

cognitive science on questions of human nature. In developing an incompatibilism that advocates *for* the possibility of choice at the same time as it engages cognitive science seriously, both commitments need careful consideration.

Conceptual coherence, understood as holding propositions that cohere by the standards of Western logic, is a highly prized virtue in scholarship, requiring enormous effort to maintain as experience enriches and nuances understanding. Often, coherence acts as a locked gate, keeping out those experiences and the ideas they inspire that do not cohere with the established consensus of the gatekeepers but that are nonetheless compelling on other grounds. Alternatively, coherence can be wielded like a machete, hastily cutting through a diverse rain forest of compelling experiences on the way to some predetermined destination called reality. Certainly, variations on this understanding of the uses of coherence inform philosophies of science, from explaining the necessity of scientific "revolutions" (Kuhn [1962] 1970) to understanding the "hard core" of scientific theories in the methodology of scientific research programs (Lakatos 1978). If commitments to coherence can both obstruct as well as facilitate scientific progress, it is obvious that coherence can play both roles in theological engagement of science as well. Thus, requirements for coherence in the engagement of cognitive science by theology may need to be relaxed somewhat in order not to lose sight of that which is most compelling within human experience.

One obstacle to relaxing coherence requirements enough to carefully consider unexpected experiences is the conviction that incoherence entails incompatibility. Engagement between incompatible views entails perpetual conflict, and this is never the goal of serious engagement of science by theology. But incoherence does not in fact entail incompatibility. Two views, two explanations, may not cohere and be perfectly compatible precisely because they function in different contexts and have different aims. Examples from within science include the Brønsted-Lowry and Lewis theories of acids and bases in chemistry, particle/wave duality of matter in physics, and single-unit and distributed-network theories of neural coding in neuroscience. In these examples, each view functions very well in defined contexts, and there is no question of incompatibility due to incoherence.

Moreover, strict adherence to coherence becomes problematic as soon as one allows any distance between one's concepts and the reality they purport to describe. Only when one expects one's concepts—including concepts of Western logic—to perfectly capture reality can one, assuming a unified reality, expect perfect conceptual coherence. Such would be the position of a naive realist who is committed to coherence. Because naive realism is not desired or required for serious engagement of cognitive science by theology, neither is the expectation of perfect conceptual coherence (i.e., synthesis) between science and theology. It is true that most people prefer conceptual coherence to incoherence, and it is likely that this

preference inclines toward misuses of coherence. Imre Lakatos, who accepted that "Kant undid the notion that for a proposition to be true it must represent something else" (Hacking 1979, 385, quoted in Larvor 1998, 62), was often frustrated "at having to explain [such] philosophical 'commonplaces' to his distinguished colleagues" (Larvor 1998, 64). Theologians often share Lakatos's predicament with regard to their distinguished scientific colleagues, who more often than not espouse some form of materialism which they have not critically examined. And theologians who desire serious engagement not just with science but with practicing scientists may be inclined to put off epistemological tutoring of their scientific colleagues, when needed, out of a desire to be collegial and dialogical and to avoid giving offense. Theologians also must know, however, that one of the greatest contributions they can make in engaging science is to educate practicing scientists regarding philosophical approaches to science and to knowledge broadly considered. Another is to uphold and articulate the significance of compelling human (religious) experiences that otherwise would be dismissed by various scientifically determined worldviews.

Undoubtedly, it was collegiality and the desire for respectful dialogue that led to Peterson's saying that cognitive science has already explained most functions of mind and that those who do not do scientific research should stay out of conversations regarding the nature of human consciousness. It is not clear how much this collegial respect of cognitive science influenced, via coherence maximization, the development of his eschatologically limited compatibilism. As for the first assertion, most senior neuroscientists would say that we have not scratched the surface of brain function and would point as evidence to the fact that there is no grand theory of the neural basis of thought and behavior.[6] As for whether those outside of scientific research can make contributions to understanding human consciousness, this would seem to be the motivation for including philosophy of mind as a branch of cognitive science, not to mention experts in meditation and phenomenological reflection, which is being done in neuroscientific studies of consciousness.

Peterson's second commitment is to an ecological ethic radically connecting human with nonhuman nature. This commitment must be upheld, because Peterson argues convincingly that theologies stressing the mental, or the soulful, as separate from embodiment will not be able to seriously engage cognitive science. Moreover, theologies rejecting embodiment as essential to human nature cannot seriously engage with any science, in particular ecology and evolutionary biology. And, as Peterson makes clear, Christian sacred narrative does not support the disembodiment of human nature, something overlooked by much of Christian tradition. Finally, because theology always implies a theological ethic, it is unlikely, given the witness of greening movements within Christianity, that most Christian theologians would want to continue espousing a radical

separation between human and nonhuman nature, with all that would mean for Christian ecological ethics.

Now we can return to the question of whether there is an incompatibilist view of human freedom that argues for the possibility of choice while being able to seriously engage cognitive science and affirm the radical embodiment of human nature. I propose that the answer is yes, and in the rest of this essay I attempt to sketch elements of such a view. An expanded account of this view is under development (Spezio forthcoming). In brief, this view draws upon David Lamberth's interpretation of William James's radical empiricism (Lamberth 1999) and advocates serious encounter of humanity in three persons (I, You, She/He), with three conceptual perspectives that are shaped by the circumstances of concrete experiences. Because this view does not give primacy to third-person accounts of human nature independent of the context of inquiry, it refrains from endorsing causation as the only or the best kind of explanation, again independent of the context of inquiry. Under this view, reasons do not require causes, and human embodiment is strongly affirmed, but the body is not understood only or mainly as a physical object.

The point of departure for this view is James's recognition of the limits of conceptual logic and the detrimental effects that arise "when it is exclusively extended to the whole philosophical enterprise, and thus made prescriptive of the whole of reality" (Lamberth 1999, 183). Any kind of conceptualization temporarily, albeit incompletely, isolates a part of the agent's experience as a whole. Isolation—the agent's focus—is strongly influenced by the agent's interests at the time. This suggests that conceptual coherence should not be granted absolute primacy in constructing understandings of human nature, as already discussed. Once James internalized this view he could espouse a real difference between human concepts of the physical and the experiences that gave rise to them. Lamberth states this view as holding that "experience as a whole consists of an experiential system one part of which also forms a physical system" (1999, 190–91). The other part is generally described as a mental system, but the two conceptual systems should not be reified as substances, nor should one be given priority over the other independent of context and interests. Indeed, even together they should not be expected to describe reality (for James, "experience") as it really is. Of course, for James, experience gives "direct acquaintance" with reality, since the reality is pure experience (Lamberth 1999, 182–83). Certainly, conceptualization and exercise of interest by an agent must affect that agent's subsequent experience. It is thus difficult to understand what James meant by "direct acquaintance." But one need not endorse direct acquaintance in order to appreciate what James is doing here. One may instead simply recognize that human finitude and the limitations due to the kinds of bodies we have and the varieties of interests

we exercise constrain the kinds of experiences and thus the forms of knowledge we can have. Still, the experiences are prior to and are given priority over the conceptual systems we use to reflect upon them.

But experiences of human nature come in a variety of contexts and from within three overarching, conditioning perspectives: the subjective I, the relational You, and the distanced She/He. To allow experience to inform our conceptual systems—and to avoid shutting out or cutting away compelling experiences, such as subjective experiences of freedom, because of conceptual limits—we do well to focus on humanity in three persons. Of course, this tripartite conceptualization of human experience is just an abstraction, and of course which perspective is accorded primacy will depend upon the permeating context and the interests of the inquiring agent(s). Yet the tripartite schema can help frame inquiry into compelling experiences so that they are given the serious consideration they deserve. Most mainstream neuroscience and much cognitive science recognize first- and third-person experience of human nature, give ultimacy to third-person accounts, and leave out the key second-person perspective altogether (Debiec and LeDoux 2003). Third-person accounts are then called physical accounts of human nature, with all of the causal determination thereby implied. This was alluded to earlier in the discussion of Peterson's compatibilism.

It bears saying that third-person (i.e., scientific) accounts of human nature are absolutely desired and required within certain contexts and in view of specific interests of inquiry. Within these contexts and in view of these interests, cognitive science must have primacy, and of course it generally does without much question. Causal accounts of human nature are legitimate in these situations, since they are defined in such a way as to bracket, or temporarily suspend inquiry into, first- and second-person experiences. The experimenters bracket their first- and second-person experiences, and the experiments generally do not inquire after the first- and second-person experiences of experimental subjects. This method is responsible for the tremendous progress in cognitive science to date, and there is nothing in the tripartite view of human experience to challenge its validity. Indeed, cognitive science should be encouraged to develop to the fullest possible extent a third-person account of human nature. The one caution is that science should not then turn around and dismiss compelling first- and second-person experiences not included in its conceptual schema. A theology that views humanity in three persons can thus seriously engage cognitive neuroscience on questions of human nature.

Does this tripartite view then allow an incompatibilist to support the possibility of choice? Yes, because this view frees human nature from ultimate causal determination, independent of context and interests, and affirms the efficacy of deciding for reasons. Causal determination of human nature is incoherent with many first- and some second-person experiences

of human freedom and with the interests of moral agency. Causal determination emerges out of a conceptual system based in third-person experiences that result from carefully managed situations and intensely focused interests in specialized inquiry. Thus, extreme care must be taken when attempting to apply causal determination—and any scientific notion of the "physical" entailing causal determination—to situations not constrained by the context and interests of scientific experimentation.

Where does this leave human embodiment? If the body is not physical, what is it? Or is the view here just another version of idealism? First, recognize that human embodiment does not entail that the body is simply a physical object wholly describable by a scientific account. Instead, embodiment includes notions of human sensuality, emotionality, movement, desire, and feeling. It is not restricted to the idea of the body as an animate machine or piece of meat, for example (Pinker 1997, 96). Saying that the body is *physical* is fine if this term is used as a descriptor that does not restrict understanding to scientific physicality. Nor should the physicality of the body be taken to imply the disembodiment of the nonphysical human mind or soul. The human embodiment required of the incompatibilist view articulated here, which affirms a radical connection between human and nonhuman nature, affirms also that human persons have no possibility apart from or except for human bodies.

Of course, this entails that humans are indeed constrained to be free, such that the way human nature is means that some choices will lead in directions that prevent or severely restrict any subsequent possibility of choice. Choosing to use heroin once, for example, may prevent any possibility of choice against using heroin in the future, in the absence of medical intervention.

Is there a possible Christian theology that affirms human embodiment while viewing human nature in three persons and at the same time is capable of serious engagement with cognitive science? This question opens up exciting possibilities for research programs of various kinds, drawing on sacred narrative and tradition while genuinely seeking information from and engagement with cognitive science. Indeed, there is one Christian theological account of human nature within recent tradition that has a number of the elements described here: a view of the human in three persons, a commitment to metaphysical freedom, a strong affirmation of human embodiment, and a respectful view of science. I am describing the theological anthropology of Karl Barth, as expressed in his *Church Dogmatics* (Barth 1960, 222–436).

Barth often is characterized as a soul/body substance dualist, but this is the result of misinterpretation of his views and of his failure to always be clear in his language. Barth denies human disembodiment but is aware of the influence that it has had on Christian tradition: "We necessarily contradict the abstractly dualistic conception which so far we have summarily

called Greek, but which unfortunately must also be described as the traditional view. According to this view, soul and body are indeed connected, even essentially and necessarily united, but only as two 'parts' of human nature" (Barth 1960, 380). He also eschews materialism: "We obviously do not see man if we will not see that, as he is wholly his body, he is also wholly his soul, which is the subject, the life of this body of his" (1960, 383). Barth identifies human subjectivity with the soul and gives primacy to this subjectivity, but the soul is not for him a separate substance or even a separate part of human nature. Although Barth's language is not always as careful about this as one might wish, and he does express some sympathy for substance dualism, he nevertheless finally weighs in against both the parallelism of Gustav Fechner, Wilhelm Wundt, and others and the interactionism of Hans Driesch and Heinrich Rickert. Barth accuses these accounts of human nature of talking only about "the soul and body of a ghost and not of real man" and instead holds that body and soul are "two moments of the one human activity" and that "man himself as soul of his body is subject and object, active and passive" (1960, 429). Barth is no dualist and is committed to a human embodiment that is no mere materialism but radically connected to nonhuman nature, affirming that nonhuman animals have spirit and the possibility that nonhuman animals are also "souls of their bodies" (1960, 395).

Much more work needs to be done to unpack what has been said here and to develop it into a coherent theological account of human nature. Such an account will draw on James, on Barth, on other theological anthropologies including Peterson's, and on contemporary cognitive science. Key questions will involve how one can recognize and use appropriately the first-, second-, and third-person perspectives, being sensitive to contexts, interests, and the limitations they bring with them. It is likely that cultivating awareness of shifting contexts and limited interests will increase possibilities for choice, for a lack of this awareness leads to automaticity (or habit) and unexamined decision making. A great deal of work is also ahead in order to persuade practicing cognitive scientists that such a view does not invalidate their scientific practice or their claim to epistemological primacy within defined contexts and according to specified interests. Working out how this is so will require attentiveness in dialogue and a dedication to human experience in all of its compelling detail. It also will necessitate a close consideration of the ways in which humans are in fact constrained—by biology, by culture, by finitude—to be free. Peterson's emphasis on and treatment of this important issue in *Minding God* is a solid contribution to this endeavor.

NOTES

1. Cognitive science combines approaches from psychology, biology, computer science, philosophy, and anthropology to understand the human mind and behavior.
2. Compatibilism holds that all meaningful forms of human freedom are compatible with causal determination of human nature.
3. The use of the term *serious* is shorthand for "respectful, careful, critical, and dialogical."
4. There is a discussion of the difficulties that compatibilism raises for mainstream Christian theodicies in Spezio 1999.
5. Decoherence states that "environmental influence suppresses quantum interference and thereby turns quantum probabilities into familiar classical ones" (Greene 2004, 514 n15).
6. I have been told by several neuroscientists at the top of their field that neuroscience still knows very little, comparatively, about the human brain, let alone about how the brain relates to thought and behavior.

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THREE QUESTIONS ABOUT *MINDING GOD*

by Dennis Bielfeldt

Abstract. Gregory Peterson's *Minding God* does an excellent job of introducing the cognitive sciences to the general reader and drawing preliminary connections between these disciplines and some of the loci of theology. The book less successfully articulates how the cognitive sciences should impact the future of theology. In this article I pose three questions: (1) What semantics is presupposed in relating the languages of theology and the cognitive sciences? How do the truth conditions of these disparate disciplines relate? (2) What precisely does theology gain from what is central to cognitive science: the emphasis on information processing, inner representation, and the computer model of the mind? What exactly does cognitive science offer to theology beyond the now-standard rejection of Cartesian dualism, the affirmation of an embodied mind, and the repudiation of reduction? (3) What can the cognitive sciences offer in tackling crucial questions in the theology-science discussion such as divine agency and divine causation? Finally, I point to a possible begging of the question in the claim that cognitive science relates to theology because theology deals with meaning and purpose, and a particular interpretation of cognitive science grants more meaning and purpose to human beings than antecedent post-Cartesian positions in the philosophy of mind.

Keywords: cognitive science; divine causation; emergence; reduction; theology and science.

Gregory Peterson's *Minding God* (2003) introduces the cognitive sciences to the general reader and draws some general connections between this burgeoning set of disciplines and some of the traditional loci of theology, specifically the doctrines of human being, nature, and God. The book is full of basic information about study areas within the cognitive sciences, including evolutionary psychology, artificial intelligence, neuroscience,

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and primate studies. Peterson even forays into issues within the philosophy of religion such as the problem of evil, the anthropic principle, and intelligent design. Throughout, *Minding God* is suggestive and exceptionally well written. It will be used widely in religion-and-science courses at both the undergraduate and graduate levels.

Minding God ably lays out some of the basic issues confronting the effort to relate the cognitive sciences to theology and sketches some general proposals for how one might (or might not) theologically understand human personhood and the world in light of the cognitive sciences. It is not entirely clear, however, what enduring significance cognitive science actually has for the future of theology.[1] What does cognitive science offer to theology beyond the rejection of Cartesian dualism, the affirmation of an embodied mind, and the repudiation of reduction? Is there something particular that theology gains from the cognitive sciences' emphasis on information processing, inner representation, and computer model of the mind? In addressing this question, much depends upon how we define theology.

Minding God neither articulates nor defends a grand, constructive position as to how cognitive science can help us understand the nature of the divine mind, divine agency, or divine causation. Rather than advancing a constructive proposal about how models of mind employed in cognitive science aid in conceiving the divine, Peterson's book is a mosaic of suggestions about how cognitive science might influence theological content and method, especially as it relates to thinking about what it is to be a person or what the nature of nature is. There is no doubt that Peterson believes that theology ignores the cognitive sciences only at its own peril. Unfortunately, it is not always clear what perils are avoided by attending to these new disciplines.

Wisely, *Minding God* does not advance a constructive position on the nature of God, for it is not at all clear what cognitive science can offer theological reflection on divine personhood. In my opinion, the big question is whether the cognitive sciences can say anything constructive about how God's mode of being might be conceived. How can these disciplines help us understand how God could causally relate to the universe without compromising either God's divine nature or the universe's physical nature? A close reading of the book finds precious little that furthers the discussion of the central question as to how robust divine agency is possible within a physical universe assumed to be closed to overt supernatural intervention.

I focus my comments around three questions that seem critical to the attempt of *Minding God* to relate theology to the cognitive sciences. Hopefully, raising them will forward the conversation Peterson has opened between theology and the cognitive sciences. The first question is semantic, the second, broadly speaking, epistemological, and the third metaphysical. They are as follows:

1. What view about the *truth conditions* of theological assertions is presupposed by the attempt to relate theology and the cognitive sciences in the way that Peterson does? Does Peterson's penchant for a scientific theology presuppose a type of realism? In other words, is there a fact of the matter about theology, a fact of the matter about cognitive science, and a fact of the matter about the relation between theology and the cognitive sciences?
2. Given that the dominant positions in the philosophy of mind over the last fifty years have denied Cartesian dualism and advocated monisms in which the mental is conceived to be somehow realized within the framework of the neurophysiological, what specifically do the cognitive sciences offer theology in understanding personhood? Simply put, what are the salient characteristics of cognitive science that makes it particularly useful to theology?
3. Given the difficult theological task of somehow relating God and world, what do the cognitive sciences have to offer those who are concerned with finding a positive way to understand divine agency and causality? Is there something in particular about the cognitive revolution that can forward discussion about how to conceive the nature of the divine or the divine's relation to the world?

On Truth Conditions, Realism, and Semantics

Minding God raises important issues about the relation between theology and the cognitive sciences. Given that theology is an ancient discipline whose "data" are in large measure determined by tradition, and given that cognitive science is a startlingly new area of study whose data are discerned empirically, how do the truth conditions of the two disciplines differ, and how does this difference make a difference theologically? Related to this is the question of realism. Are real objects, states of affairs, events, and properties being referred to in theology? Are there such things in the cognitive sciences? How do the two relate? In order to get clear on these questions we must examine what Peterson believes theology is, what the cognitive sciences are, and how, in general terms, Peterson believes that these discourses relate.

Near the beginning of the book Peterson defines theology as "that field of inquiry whose primary purpose is to discern the meaning and purpose of life"; it is concerned "with the task of providing orientation and direction for the individual" (p. 14). Theology does this by providing an orienting worldview, a constructive vision of self and world that "orients believers in their interior lives and outward behavior." In accomplishing this, theology makes use of a rather complex language that must be given an interpretation. What does it mean to speak of God, the soul, and salvation?

It is important to realize how Peterson is *not* defining theology. Instead of viewing it narrowly as discourse about God and God's relation to the world, he defines theology more broadly.[2] Theology, in practice, tends toward anthropology. It is "dedicated to providing an understanding of the human person and the human situation" (p. 9). God is important only because human beings speak about and believe in such a being. According to Peterson, understanding the meaning and purpose of the self is a thoroughly theological concern. If concerns of meaning and purpose are theological, and if cognitive science relates to meaning and purpose, it follows that cognitive science relates to theology.

Peterson acknowledges the plurality of ways in which one might understand theological discourse. One might take such utterances to be basically poetic in nature. Theological concepts are here understood to be primarily disclosive in that they harbor "the potential to elicit new experiences and insights" (p. 16).[3] Peterson, however, is much more interested in a scientific theology, one that understands *God* to denote "a particular kind of being or reality in relation to ourselves and to the world." Such a theology offers explanations that "tend toward the literal." Accordingly, "definitions, propositional claims, and rational argumentation" are very important. Because theology "makes claims about the world," it has a great deal at stake in its confrontation with the cognitive sciences. Furthermore, Peterson understands the cognitive sciences to be a trajectory of empirical theories evolving over time, having particular core commitments, the most important being the rejection of behaviorism (p. 29). Over and against the latter, cognitive science takes mental content seriously in understanding human personhood.

So, how do the two disciplines relate? Is there a basic commensurability? Are the two languages autonomous, or is one semantically reducible to the other? Do the languages denote theories, one of which is reducible to or analyzable in terms of the other? Do the predicates (or properties) of one of the language supervene upon or, alternatively, emerge from the predicates or properties of the other? Does one language deal with an altogether different region of facts than the other? Or does one language merely express subjectivity and not deal with facts at all?

Peterson does not offer detailed treatment of these questions, but he does say some quite provocative things that impact on these issues. In fact, *Minding God* suggests that cognitive science should function as "data" for theology (p. 21). Peterson explains, "Cognitive science may provide insight, inspiring options that had not been previously considered. It is in this sense that cognitive science may serve as a lens for doing theology. A lens helps us to see what we might not have seen otherwise. Ideally, a lens clarifies. In this approach, cognitive science does not dictate the content of theology, but it does provide insight for getting the theology right" (p. 21).

Peterson seems to be saying that the theological tradition bequeaths a set of options that must be continually developed and adjudicated by reason with an eye toward their meaningfulness and purpose and that cognitive science can offer some reason to prefer certain theological positions to others. This entails, of course, that cognitive science has some normative role to play in theology. This should not be surprising; theology is a joint product of the claims of the tradition over and against the claims of reason. Just as the Platonic dualism at Alexandria influenced the shape of theology in the third century, the cognitive science of our day might influence the theology of our time—or so it seems Peterson would have us believe.

Peterson rightly rejects the reducibility of theology to the cognitive sciences (pp. 18–19) while pointing to the challenge that cognitive science presents for theology. Instead of advocating reduction or conflict, Peterson opts for the metaphor of the lens. Lenses help us see what has not been seen while making less focused what has previously been sharply perceived. This metaphor of cognitive science as a lens is thoroughly epistemic. Cognitive science focuses theology upon different questions than would otherwise have been the case.

Given that attention to cognitive science can influence the theological facts or beliefs highlighted or emphasized, the question arises as to precisely how what cognitive science talks about influences that about which theology is concerned. Peterson seems to want to grant theology truth conditions; he assumes that scientific theology makes statements about that which, in principle, could make those statements false.[4] The same is apparently so for the statements of cognitive science. Now the question is this: Given that something can falsify a theological statement, what is this "something"? Is it the instancing of a set of theological properties, theological events, or theological states of affairs? Is it a failure of consistency or coherency on the part of certain theological statements? Is it the mere fact that these theological statements really have little value with respect to the meaning and purpose of our life? Or is this something the fact that these theological statements cannot govern or guide the use of other language pertaining to questions of meaning and purpose?

Obviously, the realist wants to claim that there are facts of the matter that make true or false theological statements. There are many stripes of realism, all with the central assertion that there exists a set of truth conditions grounded in that which lies outside our conceptual webs or linguistic conventions.[5] Although there is little in Peterson's work to suggest that he is a *metaphysical* realist who assumes the possibility of evidence transcendent truth conditions, much of what he says is consistent with a *critical* realism that asserts the existence of particular theological facts that determine the truth value of theological statements—even when those theological facts are imperfectly known and influenced by human perception and conception.

Much of what Peterson says is, however, quite consistent with other accounts of theological truth. According to the theological coherentist, if a theological statement is consistent with and coheres with other theological (and nontheological) statements, the statement can be regarded as true. Accordingly, the truth conditions of the statement do not constitute a theological fact but rather the consistency and coherency of the statement with other pertinent statements. Simply put, on this view "God is a person" is not true because there is some being referred to by "God" having the property of personhood, but rather because such an assertion is part of a coherent set of beliefs about God.

According to the pragmatic conception, the truth or falsity of a theological statement is a function of its ability to be put to use productively in the life of an individual and/or community. On this view, it is not theological facts that falsify statements but the nonexistence of a theological consensus concerning what is deemed subjectively satisfying and promising. When Peterson speaks of theology as dealing with the "meaning and purpose of life" he seems to be endorsing a pragmatic conception of truth. Obviously, if a necessary condition for theology is its pursuit of meaning and purpose in life, and if some putative theological "fact" is neither meaningful nor purposeful, it cannot be considered a theological fact. Conversely, if theological statements are accepted, they must be meaningful and purposeful, no matter how likely it is that a theological fact might be stated by them. Defining theology as the search for meaning and purpose certainly seems consistent with construing theological statements pragmatically. It is entirely possible that a class of statements making no assertions of theological fact are nonetheless deeply meaningful.

One might also attempt to understand theological language as regulative. Instead of making assertions of fact, theological language regulates our other use of language.[6] I see little in *Minding God* that suggests that Peterson operates with this view. It seems to me that he agrees that the theology/cognitive-science discussion is concerned with truth. But much depends on the precise conception of truth assumed in considering cognitive science to be a lens for theology. Let us examine the different conceptions of truth in light of understanding cognitive science as a lens.

If cognitive science is a lens to theology, cognitive science acts to bring theology into focus. How might this focusing be conceived? On a realist construal, thematization of certain facts of cognitive science operates to highlight and/or reconsider particular theological facts. For instance, cognitive science's understanding of self or personhood might lead to a reconsideration of the doctrine of the soul. Accordingly, those portions of the tradition that downplay the immortal soul are lifted up, while those parts of the tradition advocating such a soul are suppressed. Cognitive science is presumably acting as "data" here, because it functions to give evidence to the truth of one conception over the other. Part of the theological tradi-

tion was simply wrong when it came to thinking about the nature of the soul, no matter how subjectively satisfying the belief in the immortal soul was and no matter how great the consensus concerning it.

On a coherentist notion, cognitive science could also function to suppress certain options and highlight others. Obviously, the notion that the soul is not separable from the body coheres much better with cognitive science than the dualistic notion that predominated in the tradition. Of course, when relating claims from different traditions the problem always arises as to which tradition to privilege. For instance, one might ask why cognitive science is allowed to change theology's worldview. Why not allow theology to change the worldview of cognitive science instead? When two statements or groups of statements are in tension, one set or both must be adjusted. It seems clear that theology will always be in the role of the one adjusted. On this view cognitive science does not just highlight facts but rather changes them. Instead of a lens we have a hammer.

The same problem appears to arise for the pragmatic criterion. If a certain set of theological beliefs is pragmatically useful and a set of beliefs from the cognitive sciences is also useful, how can one adjudicate between their different kinds of usefulness? On this view, will not cognitive science more than likely determine the meaning and purpose of theology? If certain aspects of the tradition no longer resonate with cognitive science, they will no longer be understood to be true. But if certain aspects connect with the cognitive sciences on the issue of meaning and purpose, they will tend to be taken as true. On this view, new developments in cognitive science could strongly influence the truth of theology statements.

In considering all of these matters, it seems that the lens metaphor requires the assumption of a particular kind of realism. Privileging scientific over poetic theology drives one to understand theology more or less realistically. However, there is a problem. Defining theology in terms of having meaning and purpose drives one toward a pragmatic rather than a realistic construal of theological statements. Meaning and purpose do not concern the facts but are a function of our attitudes toward the facts. (They are a function of our attitudes even when there are no facts.) My first question to Peterson is this: Are you advocating realism or not? If so, how does this realism link to your definition of theology in terms of meaning and purpose?

What Cognitive Science Offers Theology

Related to the first issue is that of the real distinctiveness of cognitive science for theology. What exactly do the new cognitive sciences have to offer in the adjudication of theological views on man/woman, nature, and God? It is not good enough to say that they reject a Platonic soul, a disembodied mind, and supernatural mental agency, because all of these denials

have been known by theology before the cognitive revolution. To evaluate what cognitive science can offer theological thinking one must find what features of it advance or challenge the theological discussion in ways in which previous views did not. In order to do this, we must have clarity on the essential nature of cognitive science. What are those features both conjointly sufficient and individually necessary for something to be considered a cognitive science?

I take the central hypothesis of cognitive science to be the claim that thinking is best understood in terms of the mind's representational structures and the computational procedures that apply to those structures. Over and against the behaviorist attempt to understand the mental in terms of stimulus/response conditionals, cognitive science claims that human beings actually do have mental states, states possessing the capacity of representation, states that are related to each other computationally. The mind is thus an information-processing system whose states can be both described and nomically (lawfully) linked to other states. Indeed, it is an information-processing system that runs on the hardware of the brain: representational mental states are realized by complex neurophysiological states and events. In brief, we can say that *X* is a cognitive discipline if and only if it (1) claims that the mind operates through representation; (2) claims that the mind is an information-processing system making use of computational procedures; and (3) declares that this information processing is realized in or implemented by the hardware environment.

The question immediately follows: How does seeing the mind as a representational, information-processing program help us to gain theological understanding of God, self, or world? Although I certainly agree that cognitive science provides models and metaphors for understanding human nature, the precise theological significance of this needs to be examined.

Peterson distinguishes between the metaphysical and soteriological accounts of human nature and discusses how cognitive science affects them. "Metaphysically, cognitive science profoundly affects how we think of issues of human origins, man and body, the unity of the human person, and the potential for human freedom. Soteriologically, cognitive science affects how we think of mental health and thus human well-being, our relationship to other organisms, and the nature of human cooperation" (p. 10).

There is no question, of course, that cognitive science affects how we think about ourselves and our happiness. Over and against the limitations of behaviorism, cognitive science actually has the resources to think about human thinking. In so doing, it tends to apprehend the very same freedom and dignity that behaviorists like B. F. Skinner were wont to deny. The question is this: Should this rediscovery of freedom and dignity be construed as a theological issue? Why not conceive of it as a philosophical matter? Or why not see it merely as a psychological question?

Because the languages of theology and psychology use different terminology emerging from disparate linguistic traditions, it is important to ask how the traditional terms of theology are to be related to those of the cognitive sciences. For instance, cognitive science can surely help us think about human well-being, our relationship with other organisms, and the nature of human cooperation. But it is not clear that these are soteriological issues. Can one talk about *soteriology*, a word arising within the theological context, by discussing human well-being, or is something important being left out? Can one speak of soteriology outside of a definite religious tradition? What are the criteria of application for the term *soteriological*?[7] This issue needs to be faced more squarely.

Finally, throughout *Minding God* Peterson finds in the cognitive revolution an autonomy to the mental that short-circuits any easy nothing-but reductionisms. For instance, he writes that there is "little in cognitive science to support claims that belief in God is somehow necessarily delusional or merely an opiate of the masses" (p. 187). Presumably, behaviorism employs reductions that deny the reality of the mental altogether. But such a denial of the mental cannot succeed theologically, because theology is concerned with meaning and purpose, the very things seemingly denied by such reductions.[8]

However, it is not clear that cognitive science qua cognitive science must entail a denial of relevant reductions. Indeed, Jaegwon Kim has argued that any robust mental causation must actually entail a reduction of second-order mental properties to first-order physical realizers (Kim 1999, 112ff.). The general orientation of cognitive science is undoubtedly more fruitful for theology understood in Peterson's way than crude behaviorism was, but it is possible that nonreductive physicalisms that do not highlight representational information processing might be equally fruitful.[9] In my opinion, it is not the sheer existence of cognitive science that is primarily at issue in the discussion with theology but the philosophical positions that interpret cognitive science. Some of these are truly more helpful for theology than others. In light of this, I ask Peterson the following question: What do you think is the most salient feature of the cognitive sciences that influences (or should influence) theology?

Divine Agency and Causality

In the book's eighth chapter, "The Mind of God," Peterson briefly explores the analogy from mind and body to God and world. Because he rejects a substance dualism of the mental and physical he must reject the ontological dualism of God and universe that goes with it. Such a repudiation of dualism is, of course, quite consonant with central assumptions of cognitive science—the mind is an information-processing system, capable of representation, whose processing is implemented, or realized, by neurological events and processes.

But now we run into a major problem for theology. If we use cognitive science as a lens to understand the divine mind, we must somehow think of God as embodied. This means that the representational, information-processing, computational system constituting the divine mind must be implemented or realized by some set of physical events. Given that we are assuming a scientific theology, it seems that one and only one of the following can be true if the divine mind is capable of representation and the processing of information:

1. The representational information processing of the divine mind occurs wholly nonphysically (dualism).
2. The representational information processing of the divine mind is wholly realized physically (physicalism).
3. The representational information processing of the divine mind is realized partly nonphysically and partly physically.

These three greatly limit our options, especially if we reject #3 as incoherent. (After all, if the divine mind is implemented both physically and nonphysically, some part of the divine mind remains nonembodied. This means that anyone rejecting #1 should also reject #3.) By rejecting #3 as incoherent, it is clear that #1 or #2 must hold. If ontological dualism is to be rejected, then we are left with #2. But now, clearly, we have a dilemma, for #2 implies that the information-processing, representational nature of the divine is *dependent on* underlying physical realizations. This means that God becomes the all-determined reality rather than the All-Determining Reality.[10]

Peterson, for his part, clearly distances himself from the problems associated with #2: "Awareness of the sheer specificity of human personhood seems to require that any disanalogy between God's personhood and our own be far greater than any analogy" (p. 200). Because cognitive science can show us to what extent human personhood depends on biology and society, and because God's personhood is obviously not dependent on biology and society, we learn (or should learn) from the cognitive sciences to practice the *via negativa* when trying to think the divine person: "By looking at ourselves we also see how unlike us God is" (p. 201). Instead of emphasizing the analogy between God/world and mind/body we would do better to thematize the *disanalogy*. God's personhood or nature is unlike our own. However, because the personal nature of God is so completely assumed in Christianity, Islam, and Judaism, we cannot simply say that God is not a person. Evidently, God *is* a person but a very different one than human persons. For Peterson, there "is not simply one mode of personhood but many." Consequently, "to speak of God as person is in fact to reach the boundary of language" (p. 201).

The conclusions that Peterson reaches here are by no means to be lightly regarded. If we can no longer make sense of the immortal soul, we have

lost a valuable model or metaphor to think God. Moving from substance dualism to the functionalism of the cognitive approach has not then provided us with a model or metaphor that "clarifies the theological understanding of God." In fact, things have gotten worse. We once could make some sense, from the standpoint of dualism, out of the notion of a divine mind or person; now we are left in the uncomfortable situation of having somehow to retain the language of the theological tradition with respect to person while nonetheless admitting that we have no way of understanding how divine personhood is even possible. It seems that to the degree that Peterson opts to push the disanalogy between God as person and human persons he is forced to admit that there is an ontological substance dualism between God and the universe. The argument goes like this:

1. Divine personhood is wholly unlike human personhood.
2. Human personhood is best understood with the aid of cognitive science—a representational information-processing system realized within a physical system.
3. The divine representational information-processing system is realized within either a physical system or a nonphysical system.
4. If human personhood is realized physically, and divine personhood is unlike such a personhood, the representational information processing of the divine person is nonphysical.
5. Any view claiming that divine representational information processing is nonphysical presupposes ontological substance dualism.

It seems therefore that cognitive science provides us with no models or metaphors for the theological task of understanding God, unless such an understanding of God entails that God cannot be conceived. Furthermore, the computational nature of the information processing explored by cognitive science seems inappropriate for understanding the divine mind. Surely such a mind is not ruled by an algorithm; surely such a mind is free. So what does Silicon Valley have to do with Jerusalem? My third question for Peterson is thus this: Is there anything positive that cognitive science contributes to thinking about divine agency and causation?[11]

Conclusion

What has Gregory Peterson's excellent book taught us? It has instructed us well as to much of what is happening in the cognitive sciences, and it has discussed some of these results in connection with some of the traditional loci of theology. We have learned that the human mind can be conceived by cognitive science in such a way as to downplay reductionism and save what is distinctive about us. Although the problem of consciousness remains intractable for the cognitive sciences, enough work has been done to

allow us to understand human beings as not mere automata but as functioning programs that can seemingly act purposely and with freedom. This is surely an improvement over logical behaviorism or the reductions of mid-twentieth-century Positivism. Because theology is concerned with meaning, and because cognitive science seems to grant more meaning to human beings than its alternatives do, it is fruitful to use it theologically. But, as I have suggested, should we really define theology so broadly? Is there not some begging of the question involved in suggesting that cognitive science relates to theology because a philosophical interpretation of cognitive science grants more meaning and purpose to human beings than did positions in the philosophy of mind that preceded it, and that meaning and purpose is the province of theology?

One final thought. Peterson's depiction of the relation between cognitive science and theology presupposes a very general understanding of theology. Subsequently, there is nothing in cognitive science that would allow us to better think the nature of the Trinity, the two natures of Christ, the theory of atonement, the concept of regeneration, the notion of justification, the idea of faith, the nature of church and sacraments, and the doctrine of the last things. Clearly the traditional loci of confessional theology have not been touched in Peterson's book. But, of course, this is not a problem if one believes that addressing these loci is not crucial for relating theology to the sciences. For those who think that such questions are essential to theology, however, *Minding God*—indeed, much of the theology-science conversation to date—will not be deeply satisfying.

Notes

An earlier draft of this paper was given to the Science and Religion Section of the Upper Midwest American Academy of Religion meetings, April 2003, in St. Paul, Minnesota.

1. There is no doubt that Peterson finds the cognitive sciences deeply significant for theology: "I suggest that all forms of theology stand to be affected by a serious dialogue with the cognitive sciences. Insofar as methodology and content are connected, the content of the cognitive sciences can affect the way we go about *doing* theology" (Peterson 2003, 12).
2. Indeed, Peterson defines theology broadly enough to be able to speak meaningfully about nontheistic theologies.
3. The disclosive-symbolic construal of theological language recalls the "experiential-expressive" approach thematized and rejected by George Lindbeck (1984, 31–32).
4. For instance, Peterson argues that God is not a person in the way that the cognitive sciences understand personhood (pp. 200–201). Presumably, the assertion that God possesses properties of personhood like those advocated by cognitive science is false, because such a thing does not obtain. The falsity conditions for the assertion of a divine personhood different than human personhood would be the existence of a divine person comprehendible by cognitive science.
5. There are, of course, numerous realist positions one can advocate. There is *representational* realism, which claims that one can immediately encounter only one's own ideas, concepts, or percepts, but that these strongly resemble the actually existing things. One could claim to be a representational realist, deny the resemblance of the idea to the thing, and yet hold that there is something extra-mental producing the idea in me. This position has also been termed *transcendental* idealism. In addition to representational realism there is *presentational* realism, which claims that one really does confront the things and not merely the ideas of the things. Here one might be a *naive* realist, claiming that what one experiences is what actually obtains, or a *critical*

realist, asserting that what one experiences is to some degree what is, though some of what one experiences is transformed by the causal factors leading to the distinct experience. There are other typologies one might employ in trying to grasp the various kinds of realism. Hilary Putnam's *internal* realism seems closest to a nonresembling representative realism, while the *metaphysical* realism he criticizes appears to entail naive realism (Putnam 1981; 1988; 1990).

6. Lindbeck speaks of the cultural-linguistic construal of theological language that would understand such language as that by which definite religious experience is made possible (1984, 32–41).

7. My own view is that theological language can relate to the language of the cognitive sciences as follows: The functional image of the theological term is mapped to the background language as is the functional image of the cognitive-science term. If the theological term entails the cognitive science term, the functional image of the theological term is a superset of the functional image of the cognitive-science term. If the two are equivalent, the functional images of each determine the same set. By using this strategy one avoids the temptation of thinking that the two terms are either incommensurable or somehow synonymous.

8. One can distinguish many different kinds of reduction, and it is critically important that one understand whether a particular reduction does in fact do away with meaning and purpose (Bielfeldt 2003).

9. Peterson suggests that taking the cognitive sciences into account makes it difficult to conceive any longer of theology as independent from the sciences. After all, "much of what all subjects do clearly arises out of and is made possible by the processes of the brain" (pp. 11–12). But surely there is nothing distinctive about the cognitive sciences in thinking this way. The central state identity theory championed by Australian materialism could claim the same thing. Similarly, just as cognitive science can challenge human uniqueness, so can behaviorism and all species of mind/brain materialisms.

10. I assume that if a higher-level functional description supervenes on the lower physical one and thus that higher-level properties are realized by lower-level ones, the properties of the lower level are *sufficient* for the instantiation of the properties of the higher level. But sufficiency entails determination in this context.

11. Cognitive science makes use of functionalism that understands the states of the mind to be individuated with respect to their inputs and outputs. Jill may be in the mental state of desiring beer because, upon being inputted with the perception of beer in front of her, and no relevant causal defeaters, she takes the beer and drinks it. While the mental state is defined by its inputs and outputs, it is realized by the physical environment in which it is implemented. The physical events that constitute the perception of the beer in front of Jill, the physical events that comprise all would-be defeaters, are efficacious in the output of the physical events constituting the beer's drinking. Causal efficacy is implemented at the physical level, a level sufficient for the causal relevancy of various cognitive states upon one another.

A model or metaphor that would take seriously the cognitive-science model in thinking God would have to claim that God's personhood could somehow be *clarified* or better conceived by cognitive science. Such a model would claim that the representationality spoken about by cognitive science could somehow capture the intentionality of the divine mind. A problem would arise as to information processing, however. It seems that a minimal condition for information processing is time. If God is conceived as living through time, the cognitive approach could be useful in understanding how God can be in discrete mental states. However, if God's thought is conceived classically as nondiscursive and simple—if the divine thought is but one eternal thought of all things simultaneously—it does not seem that cognitive science or functionalism can be much help at all.

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MINDING *MINDING GOD:* A RESPONSE TO SPEZIO AND BIELFELDT

by Gregory R. Peterson

Abstract. Michael Spezio and Dennis Bielfeldt have each raised important issues with regard to my positions in *Minding God: Theology and the Cognitive Sciences.* In this article I respond to several of their criticisms, including issues of the nature of theology, my stance on epistemology and realism, and issues of physicalism, freedom, and determinism.

Keywords: coherence; freedom of the will; physicalism; realism; theological method.

Although being praised is much more fun, there are few greater honors than being criticized, because it shows that one's work is being taken seriously and has avoided the two most dreaded forms of reception: faint praise and sheer silence. Dennis Bielfeldt and Michael Spezio have done me the honor of reading my work carefully and providing careful, thoughtful critiques. While I do not follow all the directions they go, their work provides me an opportunity to expand, clarify, and develop my own thinking.

Bielfeldt: Realism, Salience, and Divine Action

Bielfeldt asks me three primary questions. First, am I advocating realism or not? Second, what is the most salient feature of cognitive science for theology? Third, does cognitive science contribute anything positive to divine agency and causation? While these are quite separate and distinct questions, a clear concern for Bielfeldt throughout his essay is the nature and task of theology. Keeping this in mind, I attempt to consider his three main questions in a way that addresses this broader concern.

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So, am I a realist or not? I should note at the outset that part of the agenda of *Minding God* is to be useful for a broad audience, and one of my claims is that the impact of cognitive science for theology is not limited to a particular kind of theology (Peterson 2003, 17; see excerpt in this volume, pp. 541–54). The dialogue between religion and cognitive science does not need to rise and fall with the fate of theological realism—or any other brand of theology, for that matter.

Furthermore, I suggest that we are all realists, at least in the sense that matters. Here I consider realism the opposite not of idealism but of solipsism. When I die, my perception of the world dies with me, but very few of us would say that the world dies as well. To borrow a page from Ludwig Wittgenstein, it might be asked, What does it mean to be an irrealist? To live is to judge between what is real and what is not and act accordingly.

Clearly, however, Bielfeldt wants something more. He is looking for a general epistemological and ontological framework for theology and (more specifically) God-talk, providing me the standard options found in any introduction-to-philosophy textbook. The question might be better put, What kind of realist am I? To that end, I make a few observations.

First, I am more an empiricist than a rationalist when it comes to the question of the source of truth. In the classical philosophical divide, rationalists argue that truth can be intuited and rationally deduced, while empiricists argue that reason needs something, experiences, to work on. I am not a pure empiricist (something that may in fact be impossible), but I do give greater weight to theories that have some experiential heft or at least a connection to them. A significant factor in this regard is simply that I have not been overly impressed with the history of rationalist arguments. Rationalism seems too often prone to the claim, "You can't believe that!" A prime example of this is the Aristotelian opposition to Copernicus and Galileo, which may have been conceptually correct within the confines of their argument but was, it turns out, historically and quite dramatically wrong. Given this empiricist bent, a dialogue between theology and the sciences makes particular sense, because I would argue that theology must too draw much of its knowledge from experience. Notice that I say "much." There is room for rationalism in theology, but one must be very careful in supporting rationalist claims over empirical ones.

When it comes to the criteria for truth (How do I know what is true or not?) I would list several criteria. Ideally, a true theory has some correspondence with the data. *Data*, of course, is a construct, but, I would argue, not a specious one. When speaking of criteria for truth, I do not speak of correspondence with reality, which is something I believe (following Kant, among others) that we cannot achieve. But a central role of explanation is to account for the world as it appears to us, however we conceive of its reality status. A good epistemology should do precisely that.

Despite this, I suggest that correspondence with data is not the only criterion we should use. There is room to speak of coherence, scope, fertility, and parsimony—rationalist categories all. This implies a certain tension in my epistemology, because the desire to correspond with the data will sometimes conflict with these other, rationalist categories. This, as far as I am concerned, is all to the good. Correspondence to the data is not a be-all and end-all. Sometimes there are good reasons to resist the data, which are historically conditioned and theory-laden. Similarly, when the data are of low quality, we may at times be required to abandon, at least temporarily, the commitment to coherence. This is a crucial point that plays a role in my response to Spezio below.

Although the criteria of truth cannot be a correspondence with reality, I maintain that the meaning of truth needs to be. This may seem paradoxical, because it would seem that the criteria of truth as I have laid them out can never get us in any clear fashion to the meaning of truth (that is, correspondence with reality). Unfortunately, I think that this is correct. I can never know whether something is absolutely true; nevertheless, I inevitably must judge some things to be true—and therefore real in an ultimate sense—or not. When I make a judgment that, for instance, quarks are real, I am making (among other things) a correspondence claim. My criteria for truth may require me to believe in quarks, but why should I suppose that these lead me to believe that quarks are in fact real?

One answer might be that such an assertion is simply a faith claim, since I cannot know absolutely whether or not they are real. To some extent, I think that this is correct. However, there are reasons to suppose that the criteria of truth can be connected to the meaning of truth. That truth means correspondence with reality may be taken as a hypothesis that competes with others, and it is not unreasonable to think that the correspondence notion is (by use of these same criteria) true. For instance, while the pragmatist criterion of usefulness does not imply a correspondence with reality, it seems more plausible that something is useful because it reflects something that is true (in the realist sense). Certainly there are useful fictions, but it would be surprising if everything turned out to be a useful fiction.

These perhaps opaque comments finally allow me to speak more properly about theology. I am a realist about theology in the sense that we do make claims that the objects of theology are real. We act on theological claims (such as the promise of redemption and resurrection) not simply because they serve some regulative function but because we believe (judge) them to be true and real. Can we know this absolutely? No, the limits of epistemology prevent that, but we must judge them to be real or not and act accordingly. Integral to a scientific (rational) theology is that it make reality claims in the same sense that other sciences do. This is not to deny that religious language has multiple modes, that it functions to inspire,

console, and build communities. It is to deny, however, that theological language is limited to those functions.

This implies several things. First, theology is an autonomous discipline and not simply reducible to something else. As I lay out in *Minding God*, theology is concerned with questions of meaning and purpose. Bielfeldt takes the categories of meaning and purpose to be merely subjective, but I deny this. First, the basic questions of meaning and purpose (Who am I? What is the ultimate nature of the universe?) either clearly have an answer or they don't. And although different people obviously claim to find meaning and purpose in all sorts of things, that does not mean that each of those things is a satisfactory source of meaning and purpose, just as Paul Tillich argued that not everything valued as an ultimate concern is in fact an ultimate concern.

Second, it is a mistake to assume that the dialogue between theology and science is simply one way. Cognitive science is not a hammer. There are sometimes grounds for theology to resist (at least temporarily) the direction of the data, and my resistance to functionalism in the book is one such case. One could argue that appropriate resistance may spur new research directions in cognitive science itself. Having said this, however, I think it more natural for the flow of influence to go from the bottom up than from the top down. Cognitive science sets constraints that do not determine philosophical or theological position but rather provide boundaries within which dialogue about those positions occur.

Third, Bielfeldt complains that I do not address the main loci of Christian theology or deal sufficiently with what he considers to be the main issue of the science-theology dialogue, the issue of divine action. The latter complaint seems strange. After all, it would be odd to fault a book on medieval history for not dealing with what the reviewer considered the most important topic of history, the American Civil War. In order to be doing theology, must one simply and solely be talking about God or following the classical loci of Christian systematics? By such lights, it could be argued that Reinhold Niebuhr was not a theologian because he never wrote a systematics. Moreover, many if not all of the issues *Minding God* treats (freedom of the will, the image of God, original sin) are central to the theological tradition. Some of the classical loci that Bielfeldt claims I do not cover (regeneration, justification, and the doctrine of last things) do get their nod, sometimes prominently. Certain subjects that do not appear (the Trinity, the two natures of Christ) are missing partially because of space reasons, not because there isn't anything to say. I would challenge Bielfeldt to speak intelligibly of the embodiedness of Christ without making reference to scientific concepts of anthropology.

This response to Bielfeldt's first question is somewhat long-winded, and I shall reply more briefly to the other two. He asks me to identify the most salient feature of cognitive science for theology. I am reluctant to be so

simplistically minded, but if I had to give one answer it would be that the cognitive sciences as a whole provide an account (or perhaps a set of accounts) of human nature that is relatively unified and that provides challenges and opportunities for theological anthropology. I had thought this was obvious, but perhaps not. As his comments about the classical loci seem to indicate, Bielfeldt seems to think that anthropology is not a proper subject for theology. This would be a surprise to Augustine, who divided with Pelagius over the issue of freedom and perfectibility, and to Luther, who divided with Erasmus over the same issue. Bielfeldt's line of thinking is revealed in his criticism that cognitive science has nothing to do with soteriology. To which I reply, Really? Does not soteriology imply an anthropology? What, after all, is one being saved from? Does this not require some accounting for modern scientific accounts of human nature?

Finally, Bielfeldt asks whether cognitive science contributes anything to an account of divine action and takes me to task for denying a straightforward God:world::mind:body analogy (this after initially complaining that I don't treat this favorite subject). There are a couple of things to be said. First, it is not clear to me that the Christian theological tradition univocally supports such an analogy. Certainly the biblical texts speak of God as person and agent, but they also speak of God as logos/wisdom, an understanding of God that became dominant in the ancient world. Among others, Thomas Aquinas in his *Summa Theologica* endorsed an analogy of being (*analogia entis*), the purpose of which was to limit the literalness of person language. While Luther speaks of the *deus absconditus,* modern theologians from Friedrich Schleiermacher to Tillich have made a variety of interpretive moves that limit the literalness of personhood language when applied to God.

Moreover, the strictly dualist account of the God:world::mind:body analogy has never seemed to me to be very satisfactory. Is God simply a soul writ large, bigger and better than the ordinary run-of-the-mill soul? The theological tradition has historically maintained some connection between God and humankind (located usually in the doctrine of the image of God), but it also has maintained a categorical distinction. God is creator; we are, at best, created co-creators.

Admittedly, I am against the theological grain on this issue. A good many modern theologians are suspicious of the Greek moves away from personhood, and for some good reasons. I affirm divine personhood but recognize that there is more work to be done. What role cognitive science plays in these future models I am hesitant to say.

Spezio and the Question of Compatibilism

In contrast to Bielfeldt, who takes up several issues, Spezio focuses almost exclusively on the issue of freedom as it is discussed primarily in chapter 4 of *Minding God* and reprinted in this issue (Peterson 2004). Spezio's charges

are twofold. First, he accuses me of being a compatibilist who attempts to reconcile the existence of freedom with a physicalist understanding of the world and human nature. Following the analysis of Jaegwon Kim (2000), Spezio argues that genuine freedom (and more generally any intelligible account of mental causation) is incompatible with physicalism so that I must, in the end, choose between the two. Second, he charges that I give the analysis that I do because of a misplaced emphasis on coherence; if only I would adopt a pragmatist/radical empiricist approach, as Spezio does, I would find myself much better off.

The general question that must first be addressed is my commitment to physicalism. I will accept the label of being a physicalist, but only with the caveat that I understand the term and its implications differently than Spezio does. *Physicalism*—and its cognates, materialism and naturalism—is a much-used term that is rarely adequately defined. In normal discourse, physicalism often is taken to imply that only those things are real which the physical sciences (meaning especially chemistry and physics) discover. The problem is that this is a nearly vacuous position ontologically. While modern physics would have us believe in quarks, gluons, electrons, and the like, if tomorrow physics discovered Leibnizian monads, presumably a physicalist would have to believe in those, as different as they are from the entities described by physics today.

More narrowly, physicalism can be (and often is) taken to imply that only those things are real which have been uncovered by the physical sciences to date, or (more contentiously) which are emergent properties (however defined) of those lower-level entities. The term *nonreductive physicalism* is usually used to describe this position, and in the religion-and-science dialogue it is associated with the position of Nancey Murphy (1999), among others. I find this position to be problematic for the same reason that defining physicalism in terms of what natural science discovers is problematic. It is not at all clear to me that we are in the final stage of science where we can make a completeness claim with regard to ontology. It is quite conceivable that I will wake tomorrow to find that a new particle or even a radically new theory (à la string theory) will be discovered that will have ripple effects on ontology all the way up through biology. If so, physicalism seems a rather rickety platform.

It might be argued that such radical discoveries are unlikely nowadays. Although significant paradigm shifts have occurred in the past (the shift from Newton's physics to Einstein's, for instance), we know a great deal more about the physical universe than ever before, and we may therefore conclude that while there may be the odd particle or minor theory adjustment to make, we basically know all that there is to know, and whatever changes do take place will not have the ripple effect that my criticism of nonreductive physicalism implies. I am not much persuaded by this claim. Important issues remain in the realm of physics, such as the compatibility

of relativity theory with quantum mechanics and the nature of dark matter and dark energy. If verified, string theory would be a significant paradigm shift from current cosmology, and one could easily imagine even more unusual theories. Admittedly, such alterations would not have much to do with the larger-scale realities of biology and the cognitive sciences on the face of it. What gives me pause, however, is the perplexing nature of consciousness itself. If functionalism (the reigning paradigm of cognitive science) is unable to account for consciousness, we need to seek an alternative account that, presumably, will imply new principles. Spezio rightly notes my skepticism with regard to existing appeals to quantum mechanics to explain consciousness, so at best I can only propose a prudent agnosticism.

What would this agnosticism imply? Rather than advocating nonreductive (what I call shallow) physicalism, I argue for what I call a *deep physicalism*, which I characterize in terms of three commitments. First, deep physicalism has a strong commitment to scientific explanation broadly construed, and in this it differs from conventional supernatural dualist accounts that typically set strong limits on scientific inquiry. Second, deep physicalism is committed to the stubbornness of the data and does not simply pigeonhole complex phenomena into existing scientific categories (more on this later). Third, deep physicalism has a commitment to undiscovered principles of significance. It might be argued that, because it can appeal to radically new positions, this is not really physicalism at all. I would demur, and note that David Ray Griffin (2000) has made a similar set of distinctions with regard to the term *naturalism*. It is this distinction between shallow physicalism and deep physicalism that I was trying to get at in my distinction between open- and closed-system emergence. Perhaps I have failed in this. It is admittedly a position that needs more working out.

I give this lengthy explanation because it is necessary for responding to Spezio's claims about compatibilism. The question for me is not so much whether I am a compatibilist but what kind of compatibilist I am. In philosophical analyses of human freedom, we are usually limited to three possible options. Either we are not free and our actions are fully determined, or we are free and our actions are not fully determined, or we are free but this is somehow compatible with determinism, usually at a lower level of analysis.

Debates about freedom hinge on how freedom is defined, and here we find ourselves in a troubling philosophical situation. Freedom is usually contrasted with determinism, but determinism is often contrasted with randomness. In analyzing why an event happens, we are inclined to say that it was caused by antecedent events (and thus determined) or that it was uncaused and therefore in some sense random. But when we say that an action is free, presumably we are saying that the action is not fully caused by antecedent events and also saying that it is not simply random.

A random action is no more free than a fully determined one, and it is hardly satisfactory to say that it is a combination of the two. *Metaphysical freedom* (a term I use in *Minding God*), then, is a position that holds that an action is neither merely determined nor merely random nor merely a combination of the two. Metaphysical freedom is something else entirely. Unfortunately, we have no idea what this something else is, and so the advocate of metaphysical freedom must either appeal to mysticism or to the stipulation of freedom as a brute, unanalyzable reality.

Because this is such a philosophical nonstarter, I prefer to start by speaking of *empirical* freedom rather than metaphysical freedom. Empirically (phenomenologically), we have the experience of being free. For at least some of the actions that I perform, I have the sense that I perform them because I (the conscious self) will to do so; the conscious self has a causal role to play in the actions that I perform that is not fully determined by antecedent events. The question before us when we turn to the cognitive sciences is whether this empirical sense of freedom is accurate or not. Here, I have perhaps not been as clear as I could be. In the book, there were three claims I was trying to make, and I shall try to spell these out a little.

First, we are clearly not free without limit; cognitive science shows that there are physical and biological constraints on our freedom of which we are sometimes only dimly aware. This is partially the point of citing the scientific literature that I do. I cannot simply will myself to be joyful (or, conversely, depressed) in any serious sense. This is a negative constraint. There are certain things we cannot do, and the various forms of mental illness and brain injury that human beings suffer testify to this.

Second, cognitive science suggests that there are constraints in a positive sense, that the kind of brain/mind that we have enables us to do things that we might not be able to do otherwise. What do I mean? The point is best made in terms of species comparison. The brain of an iguana is different from the brain of a chimpanzee, which is different from the brain of a human being. The brain of each enables each organism to do certain things. Take away specific regions of the brain, and cognitive ability (with some important exceptions) is correspondingly curtailed. This is an important point. The kind of brain that we have enables us to do the kinds of things that we do, and this should be seen in no small way as a wonderful gift.

Neither of these points, however, detracts from my third claim, which is that the sense of empirical freedom (that the cause of my actions is me, the conscious self) is true. Here perhaps Spezio and I disagree. After all, if points one and two are true, can there be freedom in any real sense left? If cognitive science shows that mind is constrained by the brain, how can I be free?

Terminology is important here. To be constrained is not the same as to be determined. To give an example, an individual is constrained by a physical handicap (say, a leg injury) but not necessarily determined by it. I am

constrained by the fact that I have no wings, but I am not determined by that fact. Despite my winglessness, I can still fly in an airplane.

But if cognitive science is accurate, does not the brain determine the activities of the mind? If the mind is supervenient on the brain, then (following Kim, as Spezio suggests) isn't the mind reducible to the brain? My first problem here is the construal of the brain-mind relationship. The presumption of much of the supervenience debate is a shallow nonreductive physicalism to which I do not adhere because of the problem of conscious awareness. Any reduction would have to be to some future, deep physicalist understanding of the mind/brain. The proper question in this context, I argue, goes something like this. When we have a complete understanding of the physical world and a complete understanding of what the mind and brain are and how they work and interact, will that give an exhaustive answer to the mind/brain? The answer (tautologously), is Yes. But it is not clear to me ahead of time in what sense this complete understanding would be reductive or deterministic. Indeed, the experience of phenomenal freedom, to some extent at least, militates against its being so.

This leads me to Spezio's discussion of coherence, and here I think we actually disagree much less than I have inadvertently led Spezio to believe. Spezio asserts correctly that I place a high value on coherence but incorrectly that I place an absolute value on it. As I have noted, coherence is one of several criteria used for judging the truth of claims, and I agree with Spezio that the rawness of experience is another. The question is how to balance the relevant values, and I confess to placing greater emphasis on coherence than Spezio does. With regard to his proposal sketched out in the final pages of his response, I have both sympathy and concern. My concern is that an adherence to multiperspectivilism not become an excuse to not look for coherence where it may exist. It is this search for coherence that makes a dialogue with the cognitive sciences exciting and that may pay off in unexpected ways as the dialogue continues.

Conclusion

I end with a mea culpa. I have not answered sufficiently. Bielfeldt and Spezio both ask important questions, and a sufficient answer requires lengthier responses. But they have asked the right questions, and I hope to be able to answer them more satisfactorily in the years to come. They also reveal the extent to which the basic questions of theology-and-science dialogue are linked. To understand the problem of freedom is also, necessarily, to make claims about physicalism. To make claims about physicalism is to make claims as well on basic issues of ontology and epistemology, of realism and coherence. To realize this is to realize how truly difficult a good religion-and-science dialogue is and how much work is left to be done.

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Articles

NATURAL LAW AND DIVINE ACTION: THE SEARCH FOR AN EXPANDED THEORY OF CAUSATION

by Philip Clayton

Abstract. Talk of divine action faces its greatest obstacle when it confronts natural law and efficient causation. If all valid explanations involve deterministic laws, and only microphysical causes actively trigger change, claims for divine action can serve no explanatory role. But science does not in fact require the limitation to downwardly deterministic laws and efficient causes. Evidence supports the existence of emergent systems of phenomena, which, though dependent on physical law, also display emergent causal powers not reducible to their subvenient systems. Careful study of top-down causation in biology and of mental causation in psychology offers analogies that are helpful for making sense of the notion of divine action. Theists' ascription of a causal role to God cannot be proven from science or identified with scientific forms of causality. Nevertheless, if the emergence hypothesis is correct, theistic explanations do not need to conflict with science, and a plausible model of divine influence may even be derived from emergent causation. In this article I offer an expanded theory of causation that reduces the distance between two types of causal forces that are often held to be incommensurable.

Keywords: determinism; divine action; emergence theory; evolution; mental causes; miracles; natural law; presumption of naturalism; quantum physics; theory of causation; top-down causes.

Physical science, it appears, leaves no place for divine action. To do science is to presuppose that the universe is a closed physical system, that interactions are regular and lawlike, that all causal histories can be traced,

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and that anomalies will ultimately have physical explanations. Traditional assertions that God acts in the world conflict with all four of these conditions: they presuppose that the universe is open, that God acts from time to time according to particular purposes, that the ultimate source and explanation of these actions is the divine will, and that no earthly account would ever suffice to explain God's intentions.

Moreover, one faces a certain threat of equivocation when one speaks of both God and physical objects as *causes*. Perhaps the meaning of cause used of a chemical catalyst and of God's upholding the universe diverges so widely that the same notion should not be used to express both claims. Only if one can provide some broader account of what features chemicals and providence share in common as causes can one make sense of Jewish, Christian, and Muslim claims for divine action in the world.

The problem of divine agency is therefore one of the most pressing challenges theists face in an age of science. Christians and Muslims in particular traditionally have been committed to a robust account of the actions of God or Allah within the natural order. But how can one attribute events to the causal activity of God when science is based on the assumption that any given event is part of a closed system of natural causes? What conceptual framework might allow believers to acknowledge the power of science without reducing the divine to a "God of the [few remaining] gaps" or to utter passivity? I assume, because one can hardly deny, that science has been massively successful in explaining events in the natural world. What causes most of the effects we observe in chemistry and physics is not up for grabs, and well-attested scientific explanations are not just one story among the rest. This is not to deny that scientific conclusions are always preliminary; they remain open to revision, and some will be falsified. Still, the fact that a given theory will possibly be revised in the future does not imply that it stands on the same level as all other accounts of the phenomena on the market today (Clayton 1997).

Questioning Determinism and Causal Closure

The problem is not just that science has a preference for non-divine causes. Far more serious, many have argued that the physical sciences presuppose the principle of *causal closure*. A core principle of physics is the principle of the conservation of energy: in classical physics predicting the dynamics of physical systems presupposes that the total energy of the system remains constant. (Of course, thermodynamics allows for calculating the evolution of systems that are far from thermodynamic equilibrium.) It is still standardly assumed that the total energy of the universe remains constant, although there are cosmological models that do not make this assumption. If one cannot establish values for the increase or decrease of energy in a system, one cannot compute many of its fundamental physical parameters and behaviors.

Combine these various requirements and one has the principle of causal or physical determinism. As William James notes, determinism "professes that those parts of the universe already laid down absolutely appoint and decree what other parts shall be. The future has no ambiguous possibilities hidden in its womb: the part we call the present is compatible with only one totality" (James 1956, 150). This determinism of physical causes involves the claim that the physical state of the world at a given time determines the physical state of the world for all future times. It is thus a *modal* notion, because it denies that it is physically possible that the present state of the world should give rise to more than one future state of affairs (Brighouse 1997).

Physical determinism is fundamentally a claim about causality—that all that happens is a necessary effect of antecedent efficient causes. At the same time, it claims that all physical occurrences are lawful: the universe is such that a given set of physical events can give rise to only one successor set. All versions of determinism accept the ontological thesis that the state of the universe up to and including the present time t determines the universe's state in subsequent moments. Obviously, if what happens at $t+1$ is determined by the physical state of the world at t, no place remains for divine action.

The challenge for theists is compounded by the fact that the ontological thesis usually begets an epistemological thesis: that future states could be predicted if one had enough knowledge of the past and present. Its most famous version is Laplace's thesis that all future and past events could be predicted from a complete knowledge of the present:

> An intelligence which knows at a given instant all forces acting in nature, as well as the momentary positions of all things of which the universe consists, would be able to comprehend the motions of the largest bodies of the world and those of the smallest atoms in one single formula, provided it were powerful enough to subject all data to analysis. To it, nothing would be uncertain; both future and past would be present before its eyes. (quoted in Margenau 1968, 3)[1]

Through their (often tacit) appeal to this epistemological thesis, debates about determinism frequently turn into debates about what is physically possible, leading to another set of challenges to theists. It is *physically possible*, in a broad sense of this term, that a divine agent exists—a being with no body who is utterly separate from this world. It seems, however, that the actions of such an agent could not be scientifically known, because all the scientific observer would detect would be anomalies in causal sequences in the physical world. In a stricter interpretation of the term, the existence of a divine being is not just unknowable but physically impossible, because God is not a physical thing. If the strict interpretation is correct, theism and physicalism are incompatible.

I argue that physics does not *require* either of these interpretations. Nonetheless, modern science has generally presupposed one or the other, and by and large the stricter view has predominated.

It is on these grounds, for example, that the "new synthesis" in evolutionary biology is often taken to represent a serious challenge to theism. Evolution requires that no outside causal force be responsible for the development of more complex systems and life forms; random genetic variation and selective retention through the environment are, strictly speaking, the only allowable causal determinants of the evolutionary process. For its part, theism requires that the development of life be intended by God, so that God is in some sense responsible for the outcome. Some Christian biologists, most notably Arthur Peacocke, have argued that God could have initiated a process of cosmic evolution that God knew would lead to the development of conscious life without anything further being required on God's part (Peacocke 2000, 35). But this response faces a serious dilemma. Either the development of life would have to be a necessary consequence of the Big Bang (which does not seem likely, given the quantum uncertainties involved), or God would have had to be ready to intervene, and perhaps actually *have* intervened, in order to bring about conscious life and to preserve it once it existed (which would contradict the hands-off position). Initially, at least, it looks like a standoff, such that evolution is incompatible with theism, and divine providence—God's action in the world subsequent to creation—is incompatible with evolution.

Needed: A New Theory of Causation

The challenge I have just sketched requires theologians to do some fundamental rethinking on the topic of divine action. The inherited tools and concepts are not adequate to make sense of divine action in an age of science. The theologian seems to be faced with a forced choice between two alternatives: either God acts as the Divine Architect only, creating a finely tuned machine and leaving it to function in a consistent manner expressive of its Designer, or God becomes the Divine Repairman, whose imperfect building of the machine in the first place requires him to return from time to time to fix errors he made the first time around. Though perhaps not impossible, it is certainly difficult to develop an alternative perspective that allows one to speak of a "different but epistemically equal" system of divine causes, alongside the network of scientific explanations, that is equally constitutive of physical events in the world.

Many attempts have been made to respond to this challenge. Some have found an opening in quantum indeterminacy. Perhaps, they argue, the physical world is fully lawlike and even physically closed (that is, the total amount of energy remains constant). But quantum physics, at least on the Copenhagen interpretation, reveals a world that is both law-governed and ontologically indeterminate: unobserved subatomic events do not have a precise location and momentum, and probabilistic laws leave some room for chance.

How much of an opening does quantum physics create for divine action? It does seem significant that quantum mechanics allows for multiple outcomes given the same initial conditions, insofar as this fact leaves room in principle for top-down influences. Still, "stochastic" or probabilistic laws are still laws. Perhaps they do not determine each individual case, but they do reflect a physical pattern that pertains to the overall system. Also, the laws say nothing about agents, much less free agents; hence, they cannot themselves provide the stronger sense of counterfactual free action that theists appear to need to make the case for divine action.

This lack has led some to set strongly dualist notions of mental causation over against the world of physical causes. Among these nonphysical types of causation are the "agent causation" of Richard Taylor (1973) and the ubiquitous divine causation ("double agency") of Austin Farrer (1967). Such approaches posit mental or divine causes that affect outcomes without introducing new energy into the physical world. Certainly views of this sort leave room for full human and divine agency. Unfortunately, they do not integrate easily with physical science as we now know it, and some versions actually contradict physical descriptions of the world.

What then of human agency? Do humans not enjoy freedom of will: "The stick moves the stone and is moved by the hand, which again is moved by the man" (*Physica* 256a, in Aristotle 1984, 1:427; cf. O'Connor 1995)? Theists have often argued that as long as humans are free, God could act in the world. After all, if humans can break the chain of physical causality, could not God do so all the more? But free will may be less of a trump card than it appears. The dominant view within philosophy has been *compatibilism*, the view that physical determinism is compatible with human agency and moral responsibility (see Hudson 1994).[2] The American legal system, for example, holds individuals responsible if they will and then carry out an illegal action (say, murder), even if the willing was determined by prior causes. According to compatibilism, the actions of agents express their character traits; it is irrelevant whether these traits, and consequently the actions themselves, are determined by antecedent causes. Perhaps the sense of being free is just mistaken; after all, even a fully determined will could still imagine itself (falsely) to be free. Finally, many scientists argue that neuroscience presupposes—and some would argue that it has already proven—that the only causal agency is physical; aside from brain states and the body's responses, there *is* no "actor" to be found.

Clearly, it is an urgent task for theologians to provide a clear account of what they mean when they assert that God acts as a causal force within the world. To succeed at this task we need nothing less than a new theory of causation. In this essay I offer a first sketch of such a theory. The argument presupposes that dualism is mistaken and seeks to show that, nonetheless, not all causes are physical causes.

The argument has three main parts. I first concede that the threat of equivocation cannot be overcome as long as one's theory of causality includes only physical and divine causes; the gap is just too wide. By contrast, if we find evidence within the natural world of vastly different types of causes, one can perhaps extend the line to include supernatural causal influences as well. The study of the natural world does in fact reveal rather different types of causal action, from classical Newtonian causality to gravity to the influence of quantum fields to the "holistic constraints" found in integrated systems—and on to the pervasive role of mental causes in human life, as in your comprehension of the sentence, "Please stop reading this sentence!"

The objection then arises: Are not all natural causal forces ultimately explainable in terms of the laws of the underlying physical reality—unlike divine causes, which are said to issue from a transcendent and free source? In the following sections I marshal the diverse evidence and arguments that point beyond classical notions of physical causality. Taken together, they now encourage us to accept that the category *cause* includes types of influences other than mechanistic ones.

The final section draws together the results of the earlier sections in support of a systematic theory of divine action. Emergent causal levels, reflecting the hierarchical structure of the natural world, help to elucidate the nature of divine action, though they are not identical to it. The differences between natural and supernatural causation that remain do represent a continuing burden to theists in an age of science. Given an adequately broad theory of causation, however, the burden may be bearable.

This is a high-stakes debate for contemporary theists. Traditional formulations remain attractive, but they face conceptual objections that some fear are insuperable. Can a scientifically acceptable concept of emergence be developed that will reenchant the world, allowing us to speak of it again as the ongoing handiwork of God? If so, what might this theology in a new key look like? Can we again find a way to affirm the divine, as Wordsworth once did, in "the light of setting suns, / And the round ocean and the living air, / And the blue sky, and in the mind of man"?

The Framework of Emergence

Experts have identified as many as twenty-eight levels of emergence (Morowitz 2002). For simplicity's sake, however, one could speak of four major transitions in the natural world that evidence the phenomenon of emergence: (1) quantum physics to macrophysical systems and chemistry; (2) chemistry to complex biological organisms and ecosystems; (3) the brain and central nervous system to the phenomena of consciousness, or mind; and (4) the emergence of spirit within the natural order, including the question of its ultimate nature and origin. Scientists and philosophers will be able to understand the emergence of life, mind, and spirit only if

they succeed in developing a broader conception of causal influence based on emergent levels in the natural world. That broader theory of causality, *mutatis mutandis*, can in turn contribute toward a more adequate notion of God's causal activity in the world.

As a first step in formulating a constructive theory of causality, recall the early stages in the development of the concept of emergence. Aristotle's biological research led him to posit a principle of growth within organisms that was responsible for the qualities or form that would latter emerge. Aristotle called this principle the *entelechy*, the internal principle of growth and perfection that directed the organism to actualize the qualities that it contained in a merely potential state. On this view, the adult form of the animal or human being *emerges out of* its youthful form. Aristotle insisted that at least four different kinds of cause are necessary to explain this emergence: *material* causes, or the ways that the matter of a thing affects it; *formal* causes, which operate through the form internal to the organism; *efficient* causes, which work between objects to move or change them; and *final* causes, which pull the organism, as it were, toward its final *telos,* or perfection.

Aristotle's influence on Hellenistic, Islamic, and Western medieval philosophy cannot be overstated. Through Thomas Aquinas, who directly adopted his theory of the four causes (*Summa Theologia,* Q44, A1–4), Aristotle was brought into the center of Roman Catholic theology, a place he continues to occupy among conscious and unconscious Thomists to the present day. Aquinas insisted that every event involved not only the efficient cause (what physicists would speak of today as *the* cause of an occurrence) but also the formal and material causes, that is, the influence of the matter and the form on the outcome. Baptizing Aristotle's theory of final causes, he introduced the notion of the overall purpose of God as one of the causal forces in every event, thereby making divine causal action a component in every action. Aristotle—or, more generally, Greek natural philosophy—also remained surprisingly dominant in early modern medicine, biology, and geology. In fact, biology was in many respects still under the influence of something very like this paradigm when Darwin began his work.

It is true that some contemporary theologians have attempted to preserve something like this final type of causality. One of the most sophisticated representatives is Wolfhart Pannenberg. In *Theology and the Kingdom of God* (1969, chap. 4) he adopts something like Aristotelian final causality, speaking of the power of the future as a causal constituent in every event (cf. Clayton 1985; 1988b). A similar adaptation or version of final causality is visible in Lewis Ford's "lure" of the future (1978), a notion that he adapts from Whitehead. Thomistic overtones also can be heard in theories of divine action that distinguish between primary and secondary causality—indirectly in the work of Austin Farrer (1967) and more directly in

the writings of David Burrell (1986; 1990). Such defenses of future causality in one guise or another cannot quickly be dismissed as metaphysical nonstarters.[3] Nonetheless, they have not won broad acceptance, presumably because modern scientific practice was in many ways defined by means of its exclusion of final or future causes from valid scientific theories.[4]

When science was still natural philosophy, emergence played a productive heuristic role. After about 1850, however, emergence theories were several times imposed unscientifically as a metaphysical framework in ways that blocked empirical work. Key examples include the neo-vitalists (e.g., H. Driesch's theory of entelechies) and neo-idealist theories of the interconnections of all living things (e.g., Bradley's theory of internal relations) around the turn of the last century, as well as the speculations of some of the British emergentists in the 1920s concerning the nature of mind. From these mistakes one can derive criteria for the use of emergence and some cautions concerning its misuse. Above all, speculation must never *replace* empirical science; it supplements it when broader questions are being raised. The concept of emergence is useful not as a metaphysic imposed on the sciences from the outside but as an inductive result that emerges out of a careful study of the sciences themselves.

Building the Case: Quantum Mechanics and the Question of Causation

It often is said that the development of quantum mechanics has transformed our understanding of the causal connections in the world. In one sense this is true: quantum physics countenances types of causal influence utterly foreign to Newtonian physics. In another sense, quantum physics does not genuinely move beyond the framework of physical causes in a way that helps to solve the puzzle of divine causal action—at least not until it is supplemented by a broader theory of emergence.

Consider, for example, the position of Werner Heisenberg (1962), who explained the Copenhagen interpretation by taking something like an Aristotelian view of quantum mechanics, according to which potentials are not fully actual but require the agency of an actual observer to become concrete. On this interpretation of the collapse of the wave function the observer acts as a sort of final cause, pulling a certain potential state into actual existence. Note that this view reverses the standpoint of classical (Newtonian) physics, which requires that the subject ultimately be explained in terms of physical laws.

For the Copenhagen theorists in general, when a definite measurement is made of a quantum system, the resulting macrophysical state results from two things: the preexisting quantum-physical probability distribution and the scientist's decision of what, when, and how to measure. Indeed, on this view the subject's role is in one sense the primary one: the

"world" is merely potential until the moment of observation, at which time the conscious observer resolves it into an actual state. The most extreme form of this position, propounded in some of John Wheeler's writings, holds that the entire universe may have existed in a state of quantum potentiality until the moment when the first observer emerged, at which point the universe was *retroactively* resolved into macrophysical structures such as stars and planets. At one point Wheeler even applied this logic backward as far as the creation of the universe:

> Is the very mechanism for the universe to come into being meaningless or unworkable or both unless the universe is guaranteed to produce life, consciousness and observership somewhere and for some little time in its history-to-be? The quantum principle shows that there is a sense in which what the observer will do in the future defines what happens in the past—even in a past so remote that life did not then exist, and shows even more, that "observership" is a prerequisite for any useful version of "reality." (quoted in Davies 1980, 126)

The debate between the various interpretations of quantum mechanics has not yet been resolved; indeed, there is reason to wonder whether it could ever be resolved physically. It is therefore in part a philosophical debate and, as it turns out, deeply influenced by metaphysical assumptions about causality. Interpretations pull in several different directions. Those who insist that explanations of the world be given exclusively in terms of physical causes strongly resist the Copenhagen interpretation, which depends in part on the causal activity of a conscious observer—even if abandoning Copenhagen means a massive loss of parsimony. It may *seem* like ontological exuberance of the worst sort to assert, with Bryce DeWitt, that "our universe must be viewed as constantly splitting into a stupendous number of branches" and that "every quantum transition taking place on every star, in every galaxy, in every remote corner of the universe is splitting our local world into myriads of copies of itself" (quoted in Davies 1980, 136; cf. DeWitt and Graham 1973). But many have held that the many-worlds theories represent a cost one should be willing to pay if it turns out that they are the only way to interpret quantum mechanics in terms of physical causes alone, so strong is their commitment to avoid appeals to observer- or intention-based (that is, final) causes.[5]

But what about the everyday evidence that subjects *do* play an irreducible part in the causal chain? This evidence inclines one to interpret the collapse of the wave function in the measurement event as a sign of the causal role of the observer—as a number of its leading theorists have in fact maintained. Instead of multiplying worlds unnecessarily, these theorists argue, one should see quantum mechanics as a (the?) point at which the explanatory story begins to require nonphysical, or even mental, causes. Thus, the quantum physicist Carl Friedrich von Weizsäcker (1952) argued that quantum physics was a sort of vindication of Kant's dualism, his sharp separation between the kingdom of causes and the kingdom of means and

ends. This was also the view taken by Eugene Wigner and his followers. Wigner used the quantum revolution to argue that "the minds of sentient beings occupy a central role in the laws of nature and in the organization of the universe, for it is precisely when the information about an observation enters the consciousness of an observer that the superposition of waves actually collapses into reality" (quoted in Davies 1980, 132). Interestingly, one of Roger Penrose's arguments against many-worlds theories also appeals to subject-based considerations. He calls them "zombie theories of the world" because "I feel particularly uncomfortable about my friends having all (presumably) disappeared down different branches of the universe, leaving me with nothing but unconscious zombies to talk to!" (Penrose 1979, 595). Penrose insists that one needs an adequate theory of consciousness *before* one can make sense of the many-worlds interpretation, at least in its many-minds forms.

Now, there also are serious objections to observer-based interpretations of quantum mechanics, objections that draw out its counterintuitive nature.[6] But the fact is that during most of the twentieth century physicists found themselves forced to entertain very un-Newtonlike forms of causality, including essentially nonphysical causes, in order to explain the anomalies of the quantum world. Indeed, quantum physics has recently challenged classical notions of causality in yet another way. "Entangled particles" are particles emitted from a common source that preserve certain symmetries even when widely separated in space. For example, measuring the spin of one entangled particle will instantaneously cause the other to exhibit the corresponding opposite spin, even if the two particles are 10 km apart at the instant of measurement. Because no causal influence can be propagated faster than the speed of light, these results suggest a radically new type of influence or connection.[7] So-called entanglement phenomena have been cited, for example, as evidence for holistic conclusions. Even mainline physicists such as Henry Stapp find in them signs of an overarching interconnection of all things:

> The principle of local causes asserts that what happens in one spacetime region is approximately independent of variables subject to the control of an experimenter in a far-away spacelike-separated region. . . . The statistical predictions from which this result follows . . . have been experimentally tested and confirmed. Bell's theorem shows that no theory of reality compatible with quantum theory can allow the spatially separated parts of reality to be independent. (Stapp 1977, 314)

In a more extreme vein, Stapp's comments have led Ken Wilber to claim that entanglement experiments provide increased justification for the holism of the Eastern traditions:

> It is common among the "new-paradigm" thinkers to claim that the basic problem with science is that, under the "Newtonian-Cartesian" worldview, the universe is viewed as atomistic, mechanistic, divided, and fragmented, whereas the new sciences (quantum/relativistic and systems/complexity theory) have shown that the

world is not a collection of atomistic fragments but an inseparable web of relations. This "web-of-life" view, they claim, is compatible with traditional spiritual worldviews, and thus this "new paradigm" will usher in the new quantum self and quantum society, a holistic and healing worldview disclosed by science itself. . . . The problem, in other words, was not that the scientific worldview was atomistic instead of holistic, because it was basically and generally holistic from the start. No, the problem was that it was a thoroughly *flatland holism*. It was not a holism that actually included all of the interior realms of the I and the WE (including the eye of contemplation). (Wilber 1998, 38, 57)[8]

Wilber's speculations go far beyond what most physicists would be willing to conclude. Still, the founders of quantum mechanics were the first to stress that whatever ontology will finally do justice to the results and theories of quantum physics will be radically different from the everyday picture of reality that we are used to in the macrophysical world and, for that matter, in traditional philosophy. Clearly quantum physics requires some radical rethinking of inherited notions of causality in science.

Psychological Causes

Classical physics holds that all causal forces ultimately are explainable in terms of the laws of the underlying physical reality. If this view is correct, it raises insuperable problems for any appeals to divine causes, since they are said to issue from a transcendent and free source. But there is another area of science, in addition to the one just examined, that suggests the inadequacy of reductionist physicalism. If there are genuinely psychological causes, there is at least one type of causality that stretches beyond physical causality. It would then appear that the genus *cause* may include species of influences that cannot finally be parsed in terms of physics.

I have already noted the four major transitions in the natural world that evidence the phenomenon of emergence. In the case of the emergence of consciousness from the human brain and central nervous system the evidence for another form of causality is perhaps intuitively the most compelling. Obviously the social sciences (psychology, sociology, anthropology, and so on) assume that human beings are causal agents and that our thoughts, wishes, and intentions make a difference in the world. But in the last few decades the natural sciences of the human person—neurobiology, primatology, cognitive science, and evolutionary psychology—also have begun to acknowledge the realm of the mental as an emergent phenomenon. The main difficulty today, I suggest, no longer lies in showing the irreducibility of mental phenomena to physical laws but rather in demonstrating that mental phenomena can have "downward" causal effects on the body and the world (which will be necessary if one is to speak of God's effects on the world).

What emerges in the human case may not be a separate mind or soul. Instead, it is a particular *psychosomatic unity*, an organism that can do things both mentally and physically. Although mental functions supervene upon

physiological structures, mental and physical attributes are interconnected and exhibit causal influences in both directions (Clayton 2000; 2004). To say that human beings are psychosomatic unities is to say that we are complexly patterned entities within the world who evidence diverse sets of properties and causes operating at different levels of complexity. A living body and a functioning brain are *necessary* conditions for personhood, yet the irreducible gap between the third-person vocabularies of the neurosciences and the first-person vocabularies of psychology and intuition suggests that they are not *sufficient* conditions. Personhood is not fully translatable into "lower-level" terms; persons evidence causal and phenomenological properties (qualia) that are uniquely personal.

Studies of the human person must be multidimensional because persons are the result of causal influences that operate at the physical, biological, psychological, and perhaps spiritual levels—levels that, although interdependent, are not mutually reducible. In particular, psychology does not need to be at war with the experience of human actors in the world on the question of mental causation: there are genuine mental causes that are not themselves reducible to the physical systems on which they depend. As Theo Meyering writes, "macro- and micro-causes may be simultaneously operative at various levels of reality without mutual causal rivalry and thus without necessarily excluding each other" (2000, 199). The causal history of the mental cannot be told in physical terms alone because the outcome of mental events is not fully determined by phenomena at the physical level. The subjective states of experiencing joy or being self-conscious have an irreducibly mental component; such phenomena exercise a type of causal influence that includes but is also more than the physical and biological states on which they supervene.

Now, the critic may object that talk of mental causes is like returning to occult causes in the physical world or vitalist causes in the biological world. But science stopped appealing to such causes because of the recognition that the realms of physics and biology operate in a fully lawlike manner, a recognition derived directly from explanatory successes in these sciences. Is it true that human beings are analogous to rocks and cells, that their behaviors can be exhaustively predicted and explained in a bottom-up manner? I have argued that we have good evidence to think not. Indeed, the hierarchy of the sciences itself offers evidence of principles that are increasingly divergent from bottom-up physical causality (see Peacocke 1993). Causal explanations based on selection pressures play a role in the biological sciences (from cell structures through neural systems to ecosystem studies) that is different from the causal explanations of fundamental physics, just as explanations appealing to intentions as causes play a role in explaining human behavior that is without analogy at the level of cell biology.[9] Top-down causal effects are present at multiple levels, though the nature of the wholes that influence the behavior of parts varies across the levels.

The structure of DNA, for example, contains a record of the top-down action of the environment on cells and organisms through evolutionary history, and gene expression is environmentally influenced throughout ontogenesis. Similarly, in all intentional systems such as human action, the goals in light of which agents act and interpret their actions must be said to have a causal influence on their actions.

Double Agency and Divine Persuasion

Our argument to this point has important implications for theologians. It suggests that divine-action claims are not equally defensible at all levels of the natural world. Claims that there may have been a divine influence in causal histories involving intentional agents must be assessed differently than claims that God has altered a purely physical chain of events. To maintain that God influences human moral intuitions and religious aspirations is more plausible than to argue that God fixed the broken plumbing system in one's house (unless one also called a plumber to do the repairs). One reason for the difference is that we do not now and may never possess laws of human behavior. In contrast to natural scientists, social scientists can at most ascertain broad patterns of human response, and even these evidence a virtually unlimited number of personal and cultural exceptions. Within the human realm, it seems, uniqueness and idiosyncracy are the norm. No laws are broken when we speak of an individual action in a nonstandard way; indeed, this is almost what we *mean* by an individual action! "Psychological miracles"—divine causal influence on the thought, will, and emotions of individual persons—could thus be frequent occurrences. If (and only if) downward mental causation is a viable notion, God could bring about changes in individuals' subjective dispositions without negating the laws that we know to hold in physics and biology.[10]

But what kind of causal influence would this be? The great British philosophical theologian Austin Farrer developed a sophisticated account of divine action that he called the double-agency view (Farrer 1959; cf. McLain and Richardson 1999). On this view, every action in the world includes a causal role for one or more agents or objects in the world (the secondary causes) and a role for God as the primary cause of what occurs. Kathryn Tanner summarizes and defends something like Farrer's position:

> The theologian talks of an ordered nexus of created causes and effects in a relation of total and immediate dependence upon divine agency. Two different orders of efficacy become evident: along a "horizontal" plane, an order of created causes and effects; along a "vertical" plane, the order whereby God founds the former. Predicates applied to created beings . . . can be understood to hold simply within the horizontal plane of relations among created beings. (1988, 89)

Such a view of action implies that God's action in the world should be understood as something more like divine persuasion. Responding to Tanner, Tom Tracy concludes,

There are, therefore, important respects in which the free acts of creatures can be regarded as God's acts. If we deny that God is the *sufficient cause* of the creature's free acts, we can immediately go on to affirm that God acts with the infinite resources of omnipotence to *guide* those choices by shaping the orienting conditions under which they are made. In untraceably many, varied, and subtle ways, God continuously brings to bear the pressure of the divine purpose for us without simply displacing our purposes for ourselves. God's action goes before our own, preparing us (in spite of ourselves) for the unsurpassably great good that God has promised us. (Tracy 1994, 101f.)

The approach I have taken does alter how God's causal agency is said to contribute to human actions in the world, at least in comparison to classical views of divine action. On most classical views, God's decision to bring about an effect in the world was taken to be sufficient for that effect to occur; no concurrence of any finite person or object was required. On this view, by contrast, God must persuade the agent in question to act in a particular way for the event to occur. This, again, implies a special role for mental causes, understood as instances of emergent causality within the natural world that are dependent on the causal laws of biology but not reducible to them. Intentional agents can be persuaded, whereas (as far as we know) rocks cannot be persuaded to act on their own, no matter how good the arguments. Though it limits the efficacy of the divine will in the world, I nonetheless believe that this position is sufficient to sustain a viable and scientifically acceptable form of theism for today.[11]

Consequently, theists do not need to imagine that God brings about human actions or physical events by divine fiat alone. Divine causality is better understood as a form of causal influence that prepares and persuades. On the one hand, this result makes it difficult to conceive a divine influence on rocks or other purely physical systems apart from the laws and initial conditions established by God at creation. On the other hand, it does continue to ascribe to God a crucial causal role in "luring" humanity and in influencing the interpersonal, moral, intellectual, and aesthetic dimensions of human personhood. The resulting position emphasizes the genuine openness in history. One cannot know in advance that God will bring about the ends that God desires to accomplish, although one can know that, if God is God, the final state of affairs will be consistent with God's nature (Pannenberg 1980). In all of these respects, the affinity of this view with process theology's understanding of the God-world relation is clearly visible (see Griffin 2001).

Evolution as a Test Case

Evolution represents a particularly difficult test case for this theory of divine causal influence. There is no point in lowering the bar at the outset in order to make things easier for theists: I take contemporary evolutionary theory as scientists actually teach it as the starting point. The standard model requires that the evolution of life be a product of a process of ran-

dom genetic mutation, where the environment selects for the fittest individuals. However, any theist who wishes to avoid deism must assert that God in some way guides the process of evolution to bring about the divine creative intent (conscious life, persons, salvation history).

In most of biological evolution conscious beings are not present to be influenced, so the type of causality defended in the previous paragraphs cannot be employed, at least not directly. But the recent synthesis of biology and information theory does open the door to an at least analogous type of causal influence. The dimension of information became central in biology following the discovery of the genetic code responsible for the informing of the cell and organism as a whole. Recent work has interpreted biological structures (morphology) and the organism's interaction with its environment as processes involving the storage, use, and exchange of information—a sort of cybernetic or semantic version of Aristotle's formal causes. Even nutrition has been construed as the ingestion of highly structured (informationally rich) matter with low-information energy as a by-product (Puddefoot 1996).

This thinking together of information and causality has several explanatory advantages. For example, it is necessary to combine the two concepts in order to make sense of epigenetic effects—top-down causal influences—in developmental and cell biology. The data now show that a two-way interaction occurs between the DNA of a cell and the cell as a whole. Since particular proteins in the cell function selectively to cause particular segments of the genome (that is, particular elements of genetic information) to be expressed, the determining influences are top-down as well as from below. In a similar manner, social behavioral studies in primatology show how the broader environment pervasively influences the development of the organism without contradicting genetics. The effects of broader systems or wholes are indispensable parts of the complete biological explanation. Thus, Steven J. Gould writes, "Minor adjustment within populations may be sequential and adaptive. . . . Evolutionary trends may represent a kind of higher-level selection upon essentially static species themselves, not the slow and steady alteration of a single large population through untold ages" (Gould 1980, 15).

The informational approach clearly opens up parallels with information processing in the sphere of mental activity. No biological laws are broken if complicated biological systems such as the brain give rise to emergent mental properties and if these properties in turn constrain brain functioning. Because much of cognitive activity concerns information retention, retrieval, and processing, it is natural to understand mental causation as involving the interplay of informational and biological causes. But the interplay of informational and biological causes does not occur only in thought; to take such a position would be to fall back into dualism rather than understanding mentality as emergent in complex biological systems.

In fact, wherever form or structure influences biological process—and such influences are pervasive in the biosphere—one can speak of informational causation (in the sense of Fred Dretske's [1993] "structuring causes" but not generally as "triggering causes").

Although I do not think that the scientific study of evolution provides evidence of final causality (pace Behe 1996), it does seem that informational or morphological factors play a role in causal explanations of evolutionary emergence. Developing forms, be they protein structures or anatomical structures, combine with genetic (bottom-up) and environmental (top-down) influences; together these three causal factors represent the three major determinants of biological evolution. The eye of faith may see final causality—ultimate purposes that pull the whole process toward its final telos—but scientific biology can neither confirm or deny such claims. Scientifically one can speak of the purposes and intentions of the various agents that evolve and act within the biosphere, but to speak of the purpose of the process as a whole always involves the transition to metaphysics or theology.

What of that transition? Once one has shown the compatibility of evolution and conscious mental causation, as I have attempted to do here, one can at least begin the process of attempting to reconcile evolution with theism. The first step in the argument was to establish sufficient parallels between downward causal influences in biology and mental causation so that the credibility of the latter could be established without recourse to a dualistic theory of mind. I argued that information theory in biology helps to accomplish this goal. The next step is to see if one can construe divine influence on psychological processes in a way that is analogous in some ways to mental influences on biological processes. Here, however, a greater degree of difference must be acknowledged. By definition, God cannot be just a cause alongside others in the natural world in the way that mental causes can. Nor does an infinite divine being belong to the finite causal order in the way that persons do. Nonetheless, the information model, understood within the framework of emergence theory, allows for divine causal constraints on the aspirations of persons in a way that does not abrogate the functioning of natural law. No physical laws are broken if there is an exchange of information between a divine source and conscious human agents. The type of influence is at least formally analogous to the chemical effects produced when an agent shifts her attention from one object to another—an everyday occurrence. By contrast, a direct divine intervention to change the chemistry of a cell would be a troubling miracle.

Toward a Theory of Emergent Causality

I attempt now to put these various resources together into a single theory of emergent causality. As a parameter, I accept the epistemic priority of

contemporary science as a source of justified explanations about the natural world. The challenge for this project stems from the fact that explanations in the physical sciences today depend primarily on efficient causation. That is, the success of modern science seems to have been based on its preference for explanations given in terms of traceable and reconstructible causal histories in the natural world. On the inherited view any talk of form, matter, or purpose becomes causal only when it is reduced to those activating forces that directly or immediately activate change in a physical object. A causal process is a linear chain of events, each of which causes its immediate successor.

The challenge that philosophers and theologians face is to sketch a new theory of causation. But how is one to reintroduce talk of formal and final causes alongside the efficient causes that are the bread and butter of modern science? The grounds and motivation for the argument must be based on the changes that have occurred as science has moved further and further from the once-regnant ideal of universal reduction to physics. Resources for the new approach can be found, inter alia, in entanglement phenomena in quantum mechanics, mental causes in psychology, information theory and epigenesis in biology, and the structure of emergence that appears again and again as one climbs the ladder of complexity in the natural world.

Causal relations *up* the emergent hierarchy are uncontroversial, since they rely on efficient causality. The slogan of earlier modern or Laplacian science might be expressed as "causes propagate upward; explanation, and hence ontology, reduces downward." The Laplacian model in scientific explanation involves explaining complex behaviors (or: the behavior of complex bodies) in terms of fundamental forces acting on their constituent parts. It might *look* mysterious that a cell can divide and divide again or the amoeba can engage in goal-directed behavior; but, once one has understood the biochemistry of cell division, the catalytic effect of enzymes, and the basic genetic architecture and functioning of the cell, no unanswered questions remain. The aggregation of these myriad physical particles and forces tells the complete causal history of cell functioning. With this bottom-up account in place, no other causal story is necessary. Or so it seemed.

Emergence, however, shows that upward propagation of causes is not the whole story. The state of the whole—the whole chemical system within which particles interact, the whole cell, the whole organism, the whole ecosystem, the brain as a whole—affects the behavior of the particles and the causal interactions that they have. Admittedly, some argue that no actual downward causal forces are involved. Carl Gillett maintains that "all individuals are constituted by, or identical to, micro-physical individuals, and all properties are realized by, or identical to, micro-physical properties" (2003, 28). Likewise, certain branches of complexity theory,

including complexity theorists such as John Holland (1998) who use the word *emergence*, also allow only upward causation, although they do grant that something new and unpredictable (at least in lower-level terms) emerges. We might speak of these positions as involving at most *weak emergence*, emergence without downward causation. By contrast, I have argued that the phenomena allow for, and may actually require, the notion of a downwardly propagating causal influence—a view that we might call *strong emergence*.

In this essay I began with the most compelling area, the relationship of the mental to the physical. To make the position as uncontroversial as possible, I have not posited a separately existing substance called *soul* or *mind*, only the existence of mental predicates. Physicalists construe mental phenomena as properties of a physical object, in this case the brain, the microphysical causal properties of which are sufficient to account for the effects that we call mentality. In opposition to the physicalist interpretation, I have argued that the explanatory power of mental causation—for example, the ability of our ideas and thoughts to cause bodily movements such as speaking, walking, or raising an arm—is great enough that the limitation of causal forces to the microphysical level is unjustified. The onus is on those who would deny any causal efficacy to the emergent level of mentality.

I then turned to the question of evolution. It seemed like a war to the finish: evolution appears incompatible with theism, and divine providence or action in the world seems incompatible with evolution. (Sadly, much of the public battle, at least in the United States, is still fought in these dichotomous terms.) One must ask: What is the rational response to a problem that cannot be solved either from the bottom alone (through genetics and biochemistry) or from the top alone (by negating biology and imposing a theological answer)? One looks for a means to bring several different disciplines together to solve the problem—not by making them identical (which is false) or treating them as incompatible (which is inadvisable) but by placing them in a dialectical relationship. Specifically, I suggested, the contradiction is overcome if what evolution demands and what theology requires are not contradictory but complementary. Indeed, the best overall explanation is obtained when one pursues this hypothesis.

Contemporary evolutionary theory excludes vital forces or causal influences from outside. Fortunately, theism requires only that the product of the evolutionary process reflect the divine intention to create rational, moral creatures who can be in conscious relationship with the divine. This might have occurred by God's initiating a process that God knew in advance would necessarily produce such creatures without the need for any further divine guidance, though the scientific picture today makes complete predetermination seem unlikely. In the case of evolution, however, it proved possible to find an analog to the downward causation that we experience

in conscious volition. According to the analog, God could guide the process of emergence through the introduction of new information (formal causality) and by holding out an ideal or image that could influence development without altering the mechanisms and structures that constrain evolution from the bottom up (final causality).

Certain caveats and limitations pertain to the argument. First, science cannot provide evidence for final causality; such language is irreducibly metaphysical or theological. Scientific explanations of biological phenomena still must be sought within the framework of evolutionary biology, and the conclusions and constraints of that discipline are not short-circuited by this response. Next, the framework of guided emergence will not amount to the sort of control of the evolutionary process traditionally defended by theists. Guidance via the informational content of the whole or the goals of conscious agents in the world—agents whose goals may go beyond the world as a whole—is not a form of efficient or determining causation; in the end it is closer to the luring nature of formal causes associated with Aristotelian philosophy. But it *is* sufficient to provide an updated version of what was once meant by divine providence, albeit without the omnipotence and predestination that often undergirded this doctrine.

Finally, the informational final causes that I have explored do not "prove God," for one still can do adequate science without introducing them. Advocates of intelligent design (Dembski 2004) or irreducible complexity (Behe 1996), by contrast, put forward evidence that they think should convince nontheistic scientists of the inadequacy of their position. In order to convey the epistemic ambiguity intended by my position, one might say that there is a quasi-purposiveness in nature. Elsewhere I have called this, following Kant, *purposiveness without purpose*. The Kantian parallel suggests viewing such assertions as having an as-if status: the biological world develops as if it were being guided by a divine hand. Of course, one may believe something more theologically and argue for more metaphysically. But for purposes of the discussion with science, all one needs to show is that scientific conclusions do not require one to speak of this guidance as a mere fiction, and this, I believe, the argument has accomplished.

Notes

This essay is based on my book *Mind and Emergence* (Clayton 2004). An earlier draft appeared in *God, Life, and the Cosmos: Christian and Islamic Perspectives* (Peters, Iqbal, and Haz 2002). I am grateful to the editors of that book and to Ashgate, its publisher, for permission to publish this revised and expanded version of the chapter.

1. In popular writings it is sometimes assumed that scientists, who are not omniscient, will be able to predict the future if determinism is true. But chaos theory, the physics of systems far from thermodynamic equilibrium, now suggests that prediction will be impossible even in fully deterministic systems when they are chaotic.

2. Indeterminists, of course, deny this claim, arguing instead for genuine or counterfactual freedom: you did this action now, but you might have done something different even in identical circumstances. As Jean-Paul Sartre put it, "the indispensable and fundamental condition of all action is the freedom of the acting being" (1956, 436).

3. Thus, the critique of Pannenberg's future ontology as "counterintuitive" (Clayton 1988b, 650) must be taken as overly hasty.

4. Note that there are ways of introducing divine causal influence other than the Aristotelian-Thomist strategy; one thinks of theologies of process and theologies of emanation. The doctrine of emanation, at least in its most famous (Neoplatonic) form, defends the emergence of the entire hierarchy of being out of the One and the movement of finite beings back up the ladder of derivation to their ultimate source. This Neoplatonist model, of which orthodox theologians were always skeptical, allows for both a downward movement of differentiation and causality and an upward movement of increasing perfection. Ultimately, diminishing distance from the Source would lead (in principle) to a final mystical (re)unification with the One. Unlike static models of the world, emanation models allow for a fluid movement downward and upward through the various species as well as between the physical, psychological, and intellectual spheres. In those cases in which the emanation is understood in a temporal sense, as with Plotinus, the theory of emanation provides an important antecedent to doctrines of biological or universal evolution.

5. If the claims made on behalf of decoherence theories stand up to examination, much of the heated debate surrounding the Copenhagen interpretation will turn out to be moot; see, for example, Zurek 1991; 2002.

6. One objection imagines that a meter is set up to permanently register whether the radioactive particle has decayed at the end of one minute (assume an experimental setup in which there is a 50 percent probability of this occurring). Two photographs are then automatically taken of the meter reading, first photo A and then photo B. The photographs are developed, but no one looks at them. Imagine that ten years pass during which no subject observes either the meter or the photos. At the end of that time a subject looks at photo B and observes that the meter registers a radioactive decay. On Wigner's view, at that moment, but not before, the superposition of states will be collapsed, the particle will (retroactively) have decayed, the meter will (retroactively) register its decay, and photo A (which no one has yet looked at) will suddenly show a picture of the meter in its "on" position. Before that moment photo A was still indeterminate; the observation of photo B makes A determinate—despite the fact that A was taken *before* B!

7. Alternately, they might suggest a radically different type of object: a single object with two parts that remains one even when its parts are separated by vast distances.

8. When concepts such as these are fleshed out into the full form of the more radical Eastern mystics, the results can be startling: "The reason is that in quantum physics the elements are not physical themselves; they do not exist as objects. Their very existence depends on the idea of their existence beforehand. They are treated as 'tendencies to exist' rather than as already existing possibilities like the sides of a flipped coin. In the quantum world the quantum coin's sides do not appear unless someone calls for them to appear" (Wolf 1984, 17). And "thus we conclude that the 'new physics' introduces the element of consciousness into the material world. This consciousness will not arise from the molecule itself, as seen as a material unit, but will arise as a 'risk-taking' psyche—that is, one that chooses. These choices cannot be made willy-nilly. 'Reason' must begin to make its appearance, which surpasses the simple mechanism of cause and effect. We know that atoms do not follow the laws of cause and effect except statistically or on the average. To explain the evolution of learning, associative memory, and possibly even the more primitive forms of memory called habituation and sensitization, we must face the quantum. States of consciousness, feelings, emotional states, and psychology as a science may depend on the recognition that mind, the consciousness of the universe, arises through quantum physics" (Wolf 1984, 18–19).

9. These emerging orders of explanation also may involve an increasing role for top-down explanations. In intentional explanations it is even more clear that the goal for which the agent acts, or the broader context within which she understands her actions, influences the particular behaviors or thoughts.

10. Whether there is a God, and whether God in fact carries out these actions, are of course other questions that I do not seek to resolve here.

11. It remains metaphysically possible, of course, that a God who created the universe *could* bring about any effect within that universe that God might choose to accomplish. The position seeks merely to describe the standard mode of divine influence in the world.

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RESOLVING MULTIPLE VISIONS OF NATURE, SCIENCE, AND RELIGION

by James D. Proctor

Abstract. I argue for the centrality of the concepts of biophysical and human nature in science-and-religion studies, consider five different metaphors, or "visions," of nature, and explore possibilities and challenges in reconciling them. These visions include (a) evolutionary nature, built on the powerful explanatory framework of evolutionary theory; (b) emergent nature, arising from recent research in complex systems and self-organization; (c) malleable nature, indicating both the recombinant potential of biotechnology and the postmodern challenge to a fixed ontology; (d) nature as sacred, a diffuse popular concept fundamental to cultural analysis; and (e) nature as culture, an admission of epistemological constructivism. These multiple visions suggest the famous story of the blind men and the elephant, in which each man made the classic mistake of part-whole substitution in believing that what he grasped (the tail, for example) represented the elephant as a whole. Indeed, given the inescapability of metaphor, we may have to admit that the ultimate truth about the "elephant" (nature, or the reality toward which science and religion point) is a mystery, and the best we can hope for is to confess the limitations of any particular vision.

Keywords: biotechnology; culture; emergence; evolution; metaphor; nature; religion; sacredness; science.

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So oft in theologic wars,
The disputants, I ween,
Rail on in utter ignorance
Of what each other mean,
And prate about an Elephant
Not one of them has seen!
—John Godfrey Saxe (1816 –1887)[1]

The Challenge: Multiple Visions

John Godfrey Saxe may or may not have known much about elephants, but he certainly knew a great deal about people. In technical terms, what Saxe (and the originators of the story in India and China) understood was the human propensity to commit the error of part-whole substitution, in which we mistakenly infer global truths from our local experiences.

Consider recent concepts of biophysical and human nature, which differ as much as would concepts of an elephant based solely on one part of the elephant—say, the tusk, tail, or ear—as recounted in Saxe's poetic rendition of the famous story. These divergent concepts of nature, all bearing the traces of distinct intellectual points of departure, challenge us to consider how they may be harmonized or may suggest that a more comprehensive vision of nature will prove as elusive as the elephant did to the blind men.

How does this matter for science and religion? A great deal; visions of both external (biophysical) and internal (human) nature have been at the heart of theories of science and religion from Thomas Aquinas to Isaac Newton and continuing in notable contemporaries such as Ian Barbour (1997), John Polkinghorne (1991), and Holmes Rolston, III (1999). In addition to strong scientific interest in external and internal nature, questions of human nature are found in all major religious traditions (Ward 1998), and concerns regarding biophysical nature have emerged in many religions as well (Tucker and Grim 2001).

Recent scholarship on biophysical and human nature may have major implications for our understanding of science, religion, and their relationship, but it needs to be synthesized and systematically applied to science and religion alike. There are obstacles to be overcome, as visions of nature have both united and divided science and religion. In its reference to the biophysical world, nature has been invoked by scientists to reject religious or supernaturalistic explanation, but it also serves as a common sacred ground for theologians and scientists oriented toward ecospirituality. In its reference to human nature, the concept has been used to explain everything from the theological doctrine of sin to the biological basis of religion. Nature plays a central role in policy concerns of our time yet still

unites and divides science and religion. Consider, for instance, the 1991 joint statement signed by leading scientists and religious leaders declaring their common concern for environmental protection,[2] versus the ongoing dispute—with significant scientific and religious dimensions—over human cloning. In short, resolution of the question of science and religion necessitates resolution of the question of nature as well; in doing so, new visions of nature, science, and religion may result.

Nature, Science, and Religion

The term *nature* comes from the Latin *natura*, which is derived from the verb "to be born" (*natal* comes from the same root). There have been three progressive senses of the English use of the word nature through time (Williams 1983). From the thirteenth century on, nature meant the essential quality or character of something, such as the nature of a person or of mortality. Beginning with the fourteenth century, the word was also used to represent the inherent force directing the world and human beings, as in "the way of nature." Not until the seventeenth century—relatively recently in English language usage—did the word *nature* also mean the physical world as a whole. Thus it spans a wide variety of meanings in reference to both human beings and biophysical reality.

Nature is a much-abused word today, conjuring up images of untrammeled wilderness far removed from both scientific research and religious institutions. Yet the question of nature has been at the heart of science-religion dialogue for centuries, and it is no accident that the term has entered into the titles of important historical works such as *God and Nature: Historical Essays on the Encounter between Christianity and Science* (Lindberg and Numbers 1986) or *Reconstructing Nature: The Engagement of Science and Religion* (Brooke and Cantor 1998). Barbour considers nature as historically central to the integration of science and religion, as understood in two distinct ways: natural theology and theology of nature (Barbour 1997, 98–103). *Natural theology* refers to arguments concerning God's existence and properties based on empirical inquiry into biophysical nature: nature is a book of God's works, and thus natural science can tell us about God. A *theology of nature*, according to Barbour, is built on religious tradition but is open to changes in light of natural science, including scientific discoveries about reality and scientifically based environmental concern.

Nature also figures centrally in contemporary discussions of science and religion. Witness, for example, recent issues of *Zygon* in which religious naturalism and "theology coming to terms with evolution" were organizing themes, or annual conferences of the Institute on Religion in an Age of Science (IRAS), with recent themes including "Ecomorality" (2003), "Is Nature Enough? The Thirst for Transcendence" (2002), and "Nurturing Human Nature" (2000).

Despite this wave of interest, the vast majority of these efforts have been limited to selected scientific or religious metaphors or visions of nature (e.g., those adopting an evolutionary theme). A greater spectrum of visions exists and must be included if we are to fairly assess their potential for reconciliation, perhaps even integration, in the future. Five visions are considered in this article: evolutionary nature, emergent nature, malleable nature, nature as sacred, and nature as culture. The first two of these visions have arisen in the physical, life, and behavioral sciences and the final two in the social sciences, humanities, and theology, with malleable nature straddling the sciences and humanities. Taken together, these visions represent a broad, balanced scholarly approach toward reconciling nature, science, and religion. Yet, given this breadth, these visions overlap but do not immediately fit together; similarly, all have important but somewhat different implications for progress in science and religion. Hence, the overriding need is to explore means of dialogue and possible synthesis.[3]

Evolutionary Nature

The evolutionary vision of nature is the predominant contemporary scientific means of addressing questions of the origin and diversity of life, with important parallels to scientific theories of the origin and development of the universe. It links biophysical and human nature in a common naturalistic explanatory framework. Though its supposed challenges to traditional religious belief are well known, it may pose new theological insights for spirituality. It also may help us reflect on and reevaluate some of science's basic metaphysical assumptions.

Evolution is an ancient idea, but the evolutionary vision of nature derives primarily from one of the most far-reaching and influential works in the history of science: Charles Darwin's *Origin of Species* (1859). Beginning with the publication of Darwin's work in the mid-nineteenth century and continuing through the twentieth-century modern synthesis with population genetics all the way to contemporary research, the evolutionary vision of nature has played a powerful integrative role among life scientists.

Evolutionary theory is far from settled, which is understandable given its considerable power and breadth of explanation. One of its most celebrated recent interpreters, Stephen Jay Gould, released soon before his death a magnum opus on evolutionary theory, reconsidering the basic questions of whether (a) natural selection is the primary mechanism of adaptation, (b) natural selection operates at the genetic, organism, and/or group level, and (c) changes induced by evolutionary mechanisms are incremental or sudden (Gould 2002). Yet Gould's take on evolution stands in sharp contrast to that of Richard Dawkins, for whom genetic selection is paramount and the lessons of evolution apply equally to humans and nonhumans (Sterelny 2001). Dawkins's strident position on genetic selection is

opposed by more scientists than just Gould; biologist Ernst Mayr also recently rejected implications of genetic reductionism (Mayr 2001).

The discussion is equally vigorous when evolution is applied to human nature. Psychologist Leda Cosmides and anthropologist John Tooby have pioneered a new field called evolutionary psychology, an approach in which knowledge and principles from evolutionary biology are put to use in research on the structure of the human mind (Barkow, Cosmides, and Tooby 1992). Cosmides and Tooby have derived results for behaviors as wide-ranging as cooperation, love, incest, and racism. However, biologist Paul Ehrlich (2002), a staunch defender of evolutionary theory, argues that it is primarily cultural evolution rather than biological evolution, environment rather than genes, that is responsible for human behavior. These contrasting positions have been somewhat reconciled in the integrationist account of biologist Jeffrey Schloss (2002), who brings evolutionary nature into dialogue with culture in order to explain human altruism.

There are strong philosophical parallels in accounts of the evolution of life and the evolution of the universe. Both are answers to fundamental origins questions. Both have traditionally involved recourse to a deity, whether as a Prime Mover or an involved God. But scientific theories have been advanced by some to suggest that the notion of a deity is unnecessary, perhaps even impossible. It is this thoroughgoing naturalism (or, rather, anti-supernaturalism) that has united certain proponents (see Stone 2003). For instance, Steven Weinberg has linked evolutionary and cosmological theory as part of a historical process of scientific "demystification" that ultimately suggests "a chilling impersonality in the laws of nature" (Weinberg 1992, 245).

It is a popular assumption that the evolutionary vision of nature poses a direct threat to religion, and debates over evolution versus creation (or intelligent design) have persisted to the present (Ruse 2000; Pennock 2001). Considerable attention has also been directed to resolving this perceived conflict, generally by reassessing the theological underpinnings of religion and the philosophical underpinnings of science (Ayala, Russell, and Stoeger 1998; Griffin 2000).

Evolutionary nature has been seen as a threat by some scholars in the social sciences and humanities as well. As one example, E. O. Wilson's *Consilience* (1998) argues for a unity of knowledge based largely on the natural sciences, in particular a model of human nature based on biological evolution. This model predictably finds mixed support in the scholarly community (Berry 2000; Damasio 2001).

In summary, evolutionary nature is a powerful, sweeping vision of biophysical and human nature with significant implications for the relationship between science and religion, and the sciences and the humanities. These implications are far from resolved. Evolutionary nature will thus likely play a lead role in reconfiguring science and religion in the future.

Emergent Nature

A major scientific understanding of biophysical and human nature hinges on emergence, which has been invoked to explain complex phenomena ranging from biological diversity to human consciousness. Emergent nature is becoming a unifying vision for a vast array of scientific disciplines and sheds new light on traditional metaphysical questions of order and chaos, parts and wholes. Emergence also has been offered as a way to situate theology in a scientifically valid framework.

Emergent nature champions antireductionist explanation. It has been recognized throughout the ages that nature exists at multiple scales of complexity; what is the relationship between these levels? The perennial Great Chain of Being (Lovejoy 1936) posited a vast hierarchy running from matter to spirit, joining levels of complexity (and, significantly, science and religion), with higher levels ultimately explaining lower levels. However, many of the sciences, especially in the last century, have moved in the opposite, reductionist, direction, seeking explanation at smaller and smaller levels of reality.

A good example is physics, which arguably encompasses a broader range of scales of complexity than any other science does. A well-known advocate of reductionist explanation is Weinberg (2001, 107–22), who believes that complex phenomena such as mind and life do emerge out of simpler systems, yet "The rules they obey are not independent truths, but follow from scientific principles at a deeper level" (p. 115). Reductionist explanation has generally been the hallmark of physics but has not gone without criticism. A key early paper was written by condensed-matter theorist Philip Anderson in an essay aptly titled "More is Different" (1972). One of Anderson's main points is that "The ability to reduce everything to simple fundamental laws does not imply the ability to start from those laws and reconstruct the universe" (1972, 393). The early work of Anderson and other physicists has recently led to a burgeoning new cross-disciplinary field of complex systems analysis (see, for example, *Science*, 2 April 1999), which is explicitly devoted to establishing nonreductive modes of explanation of complex phenomena. This interest has spawned research centers such as the Santa Fe Institute and the New England Complex Systems Institute, with significant participation by physicists such as Murray Gell-Mann (1994).[4]

Complex-systems research has led to new ways of understanding the age-old question of the relationship between order and disorder in reality, leading to fundamental insights on nature, classically understood as part of an orderly cosmos. Pivotal to this work has been the concept of deterministic chaos, in which apparent disorder emerges from very orderly simple rules, yet this emergent disorder turns out to be quite orderly in other ways. These attributes of chaos are well known, having been popularized over the last fifteen years, and have been extended to science and theology

(Prigogine and Stengers 1984; Gleick 1988; Peitgen, Jürgens, and Saupe 1993; Murphy, Russell, and Peacocke 1995). The vision of emergent nature thus challenges the strict separation of cosmos and chaos, order and disorder in the universe. In emergent nature, randomness and pattern are linked. This very different metaphysical way of looking at nature has led to fundamental new insights in natural science fields such as ecology (May 1973; 1995; Levin 1992; 1998; 1999; Ulanowicz 1997; 1999).

Perhaps the most breathtaking recent publication on emergent nature is *The Emergence of Everything* (Morowitz 2002). In this work biophysicist Harold Morowitz assembles a continuum of twenty-eight steps of higher levels of emergent complexity rivaling in scope the classical Great Chain of Being and running from the universe to planets to cells to animals to humans to culture to spirit. Morowitz ascribes much of the recent flurry of scientific discovery around emergence to the advent of high-speed computing, which has presented new opportunities for modeling complexity in nature. Major implications exist for science as it potentially moves from mathematical to algorithmic modes of explanation (e.g., understanding the emergence of complex behaviors based on simple computational models such as cellular automata), as championed in Stephen Wolfram's *A New Kind of Science* (2002).

Morowitz's work reaches beyond science to religion in tracing implications of this vision of emergent nature. He advances the radical theological thesis that "Transcendence is an emergent property of God's immanence. . . . We *Homo sapiens* are the mode of action of divine transcendence" (2002, 195). According to the vision of emergent nature, Morowitz claims, God is to be understood as the immanent laws of nature, and human beings, who possess emergent consciousness, are the true transcendent agents in the cosmos. Others have discussed theological implications of emergence with varying degrees of departure from traditional theism. John Polkinghorne (1991) has considered implications of chaos, complexity, and emergence, linking God with the possibility of top-down causation between levels of reality. Philip Clayton's *The Emergence of Spirit: God Beyond Theism and Physicalism* (forthcoming) argues that emergence theory in recent science offers an important opening for language about the spiritual dimension of human existence, including the concept of spirit and perhaps even the idea of God. He traces emergentist arguments from the emergence of the classical world out of quantum mechanics through contemporary debates in evolutionary biology and neurophysiology and up to the emergence of spirituality and metaphysical concepts.

Emergent nature is thus in many respects an even more wide-sweeping vision than evolutionary nature. It is quite recent, may signal major changes in science, and has afforded diverse theological interpretations. Its stronger scientific advocates have not, however, escaped criticism for their ambitious extension of this vision (see Kadanoff 2002). In its theological

extensions, emergence, if not carefully articulated, can become an inspiring but fuzzy God-of-the-gaps argument; indeed, its popularity in certain new religious movements bears little resemblance to its scientific origins.[5] However, these theological extensions suggest ways in which contemporary visions of nature can have significant spiritual dimensions, to be explored later under the cultural and philosophical vision of nature as sacred.

Malleable Nature

The vision of nature as malleable straddles the sciences and the humanities. It arises in the sciences and engineering from pathbreaking research in genetics and development of new genetic technologies over the last several decades (Keller 2000) and has arisen in the same time period in the humanities in association with poststructural and postmodernist perspectives on the nature of reality and human beings (Robertson et al. 1996; Castree and Braun 2001). The vision of malleable nature challenges the boundaries of nature and the natural, because what lies beyond these boundaries—the unnatural, the artificial—is now less easily distinguishable from the realm of nature. As such, it also challenges the bedrock of biophysical and human nature upon which many societal and religious values are based (Lustig 2002; Deane-Drummond, Szerszynski, and Grove-White 2003) and has thus engendered serious discussion and debate over its philosophical, theological, and political implications. Yet this debate may lead to new, more subtle, less simplistic understandings of religion-and-science.

Malleable nature encompasses a wide swath of related topics, including human reproduction and enhancement (Paul 1998), genetic discrimination (Carlson 2001), human stem-cell research (Holland, Lebacqz, and Zoloth 2001), and food and agriculture in developing countries (Paarlberg 2001). But positions taken on these topics by scientists, religious leaders, industry, and the public have been relatively few, reminiscent of the polar "catastrophist" versus "cornucopian" stances Stephen Cotgrove detected in environmental politics some two decades ago (Cotgrove 1982). On the catastrophist side, a number of religious denominations, environmental organizations, and sectors of society have denounced biotechnology as an immanent threat to humanity and the natural world; on the cornucopian side, advances in genetic research and biotechnology have been heralded by many scientists and industry as a panacea for problems ranging from birth defects to global food supply.

Much of this academic and popular discussion has focused on developments in science and technology, ranging from the Human Genome Project (Sloan 2000) to current government-sponsored biodefense projects.[6] Proponents address public anxieties regarding risk in contemporary nature-society relations (for example, pesticide-dependent industrial agriculture) and invoke larger values concerning the proper place of humans in the natural world in casting biotechnology as a safe human improvement upon

nature (Levidow 1996). Similarly, opponents (for example, Rifkin 1998) typically invoke potential environmental risks coupled with societal disempowerment as human and biophysical nature becomes corporatized.

In a broader context, these developments have been examined in terms of implied features of science and its connections with larger political and economic processes. Peter Dickens argues that genetic research and technology treat biophysical and human nature as mechanisms comprising subsystems comprising parts that ultimately boil down to bits of information in the genetic code (1996, 107ff.). To Dickens, this fragmented idea of nature serves well its commodification in multiple market niches: Nature is stuff that can be manipulated to presumably human, and certainly corporate, benefit. Others similarly link genetic research with the increasing emphasis on profitable information in science (Haraway 1997) as witnessed in the rapid rise of molecular biology.

One important issue concerns the appropriate role of public involvement in what is arguably a complex, highly scientific issue. On one side are concerns that religious groups and the public have inappropriately forestalled benefits to be realized from genetic research and technology (see Green 2001), and on the other are concerns that science, industry, and government have not taken seriously some important complexities raised by the lay public (Grove-White et al. 1997; Grove-White, Macnaghten, and Wynne 2000). In response to public opposition and religious concern, the biotechnology lobby has invested in information campaigns, such as that by the Council for Biotechnology Information, designed to convince the public of its benefits.[7] Similarly, government has attempted to provide information and forums for public input on biotechnology in countries such as the United Kingdom, and watchdog organizations such as the Council for Responsible Genetics and the Center for Genetics and Society have provided their own resources on biotechnology.[8]

Malleable nature is not wholly restricted to the sciences. In the humanities and popular culture, a related discussion has considered malleable nature from a poststructural and postmodernist perspective. Jean Baudrillard, for instance, has argued that the malleable human genome erases the boundary between natural and artificial, real and virtual; there is no reality beyond our "Disney World" representations of it (Baudrillard 1996). And, although some have warned of the dangers of treating human biology as infinitely malleable (Fukuyama 2002), others have pointed out the historicity of supposedly biological concepts such as *woman* in arguing for an embrace of postmodern difference in biotechnology (Oudshoorn 1996). The upshot of these critiques has been a rejection of appeals to "nature" or "natural" in justifying policy and morality.

The theological response to biotechnology has been varied, and only partially advanced (Chapman 1999); its ambivalence mirrors earlier theological challenges by technology (Brooke 2003). Some, like Ted Peters

(2003), have argued for a cautious embrace as humans adopt a future-oriented outlook as responsible partners in God's creation. Others have sounded a note of concern over genetic reductionism and depersonalization implicit in a good deal of biotechnology and related evolutionary theories (Rolston 1999; Peacocke 2003). There has been a clear concern expressed about genetic discrimination (World Council of Churches 1989), though genetic research also has introduced conflicts among communities of faith as biological considerations have made their way into major moral debates such as that over homosexuality (LeVay 1994). One review suggests that the religious response to biotechnology has largely involved a consequentialist focus on impacts instead of a deeper examination of "the profound challenges to human beings' self-image, and to their relationships with one another and with the natural world" (Deane-Drummond, Szerszynski, and Grove-White 2003, 34).

In sum, much discussion concerning biotechnology has taken science and religion as givens rather than provoke a deeper examination of implications of malleable nature for the very science that studies it and religious bodies that comment on it. Preliminarily, biotechnology paints a mixed picture of contemporary science in which religion has not advanced far beyond a simplistic reading of both nature and science. Still, malleable nature is an unsettling notion, in the same way that poststructural and postmodernist notions of malleable reality are unsettling. Malleable nature is therefore both sweeping and inconclusive in its implications for science and religion and must be situated in the context of other visions of nature in order to derive robust indications for future progress in religion and science.

Nature as Sacred

In contrast to the notion of biophysical and human nature as thoroughly material entities distinct from the sacred realm of God or spirit, a more theological vision of external and internal nature has recently arisen in both scholarly and popular circles. This vision of nature, with variants running from theistic ecospirituality to agnostic religious naturalism, may serve as an important metaphysical basis governing ethical behavior, but it raises major challenges for reconciliation with both transcendent religion and scientific rationality.

Scholarly attention has been empirical (involving historical and contemporary studies of concepts of sacredness in nature and sacred space) and philosophical and theological (attempting to systematize this empirical information and understand it in light of religious teachings and sacred texts). As an example of the latter, Barbour has incorporated themes of stewardship, celebration, sacrament, and the Holy Spirit into a theology of nature (Barbour 1997, 102–3). An example of the former is the Forum on

Religion and Ecology at Harvard University, a major cross-cultural project involving a multiyear series of conferences and related publications.[9]

In the American context, Catherine Albanese has identified a perennial "nature religion" in the United States stretching from early settlement to contemporary spirituality (Albanese 1990; 1993; 2002). To Albanese, the Western religious tradition "has placed nature near the top of its short list of major categories by which to make sense of religion. God and humanity [as expressed in organized religion and civil religion] comprise the first two categories. Nature, however culturally diffuse and evanescent, forms the third" (Albanese 2002, 3). Albanese notes four expressions of nature religion in American history: the Transcendentalist legacy inherited by contemporary environmentalism, metaphysical forms of spiritualism (e.g., Theosophy) reaching to contemporary New Age practices, a revitalized emphasis on bodily healing and well-being grounded in nature, and Enlightenment-style natural religion and natural theology, expressed in peculiarly American forms such as pragmatism (Albanese 2002, 11–24). Thus both biophysical and human nature fall under this broad rubric.

Albanese's historical work is validated by contemporary social-science research. In a three-year research project exploring the scientific and religious dimensions of contemporary American environmentalism, I followed up on preliminary findings from the 1993 U.S. General Social Survey in which nearly one in four Americans preferred the statement "Nature is spiritual or sacred in itself" (immanent sacredness) to "Nature is sacred because it is created by God" (transcendent sacredness, a position with strong affinities to Western religion) and "Nature is important, but not spiritual or sacred" (nonsacredness, a position bearing affinities to the recent scientific worldview).[10] I developed a two-factor scale of attitudes regarding sacredness in nature based on six statements derived from a pilot survey including fifteen candidate statements. Results of a survey completed by over one thousand adult American respondents in 2002 suggest that American attitudes of transcendent sacredness and nonsacredness are in opposition to each other but statistically separate from immanent sacredness, which enjoyed relatively strong support from a diverse group (Proctor and Berry in press). The vision of nature as inherently sacred thus cuts across many of the more traditional scientific and religious boundaries in contemporary American attitudes toward nature. Preliminary results from a 2000 International Social Survey Programme module which included the 1993 statements, administered in thirty-eight countries worldwide, suggest significant country-specific patterns of support for transcendent sacredness versus nonsacredness but generally strong support for immanent sacredness.

A much more voluminous literature has been devoted to philosophical and theological dimensions of the vision of nature as sacred (Barnes 1994; Gottlieb 1996; Nasr 1996; Cooper and Palmer 1998; Hessel and Ruether

2000; Tucker and Grim 2001; Crosby 2002; Fern 2002; Kellert and Farnham 2002; Matthews, Tucker, and Hefner 2002; Peters 2002). This literature is quite diverse, mixing immanent and transcendent sacredness and exploring related practices in multiple religious traditions. Much of it constitutes a continuing response to Lynn White's famous thesis that the roots of environmental crisis lie in Judeo-Christian attitudes of domination over nature (White 1967), but some of this literature traces implications for human as well as biophysical nature.

What are the implications of the vision of nature as sacred for science and scientific rationality? Scientific opinion is apparently mixed. Some have strongly supported this vision as a mode of reenchantment of the natural sciences (Barlow 1997; Goodenough 1998), whereas others have charged that it constitutes a "betrayal of science and reason" (Ehrlich and Ehrlich 1996), an "assault on reason" (Lewis 1996), or "nature worship" (Budiansky 1995, 41–43). This discussion suggests different positions on the boundary between science and religion, and many of these contradictions have yet to be resolved. The vision of nature as sacred is thus quite culturally diffuse and important among theologians, humanists, and social scientists and will surely play an important role in science-religion dialogue. But more scholarly attention is needed to systematize and join its empirical and philosophical/theological dimensions and to rectify potential contradictions with science.

Nature as Culture

A diffuse vision of nature arising in the social sciences and humanities concerns nature as culture. This vision emphasizes nature's inextricable connection with human meaning in contrast to the prevalent notion of nature as entirely separable from culture. As with the other visions, it poses important challenges and opportunities for rethinking science and religion, in this case as human endeavors versus direct conduits to reality and God.

The separation of nature and culture is one of the most deeply ingrained divides in Western thought (Glacken 1967). It can be traced back at least to Aristotle, for whom nature (*physis*) is that which is not made by humans, in contrast to *techné*, that which is of human origin. It underscores ideas of objectivity that arose in the seventeenth-century valorization of scientific rationality, often grounded in nature as an objective referent, as a means of technical ordering of society based on a new, naturalist "religion" (Toulmin 1992). The idea of objectivity forced culture into the diminutive category of subjectivity and forced God into two polar alternatives—as equivalent in status to either the objectively verifiable reality explored by science or the subjective projection of a wishful or oppressed people.

The vision of nature as culture has roots in Kantian philosophy and earlier expressions of idealism, but it is best known for its recent flourishing in opposition to naive notions of objectivism underscoring the practice and interpretation of natural and behavioral science. It often is called social constructivism or the "social construction of nature" thesis (see Hacking 1999) and should be understood as primarily an epistemological assertion concerning our knowledge of nature rather than an ontological assertion concerning the reality of nature itself (Proctor 1998; 2001). Nonetheless, one of the primary tenets of social constructivism is that biophysical and human nature are incomprehensible outside of culturally based knowledge schemes, so the vision of nature as culture cannot be readily dismissed as merely a vision of ideas of nature versus nature itself.

The vision of nature as culture has been primarily championed among the social science and humanities disciplines—those for which culture is a primary category of analysis—and its assertions that reality is as much constructed as apprehended have prompted important reflections among theologians for several decades (Altizer 1962; McFague 1982; Van Huyssteen 1999). Its most vocal opponents have been scholars working in the natural sciences. This debate, known popularly as the science wars, has tended to portray philosophical caricatures of naive realism, asserting the reality and ready knowability of nature, against naive relativism, questioning the truth-value of all scientific knowledge (Gross and Levitt 1994; Gross, Levitt, and Lewis 1996; Ross 1996). Fortunately, an excellent and growing body of scholarly work has refused to accept these polarized terms of the epistemological debate over nature and culture (Simmons 1993; Cronon 1995; Keller 1995; Castree and Braun 2001).

The work of French sociologist of science Bruno Latour may serve as an example of this nonpolarized approach to the vision of nature as culture and its implications for science and religion. Latour's reframing of science and religion follows from a larger argument he has made about modernity (Latour 1993). Latour detects two contradictory processes at work in modern societies: first, the increasing proliferation of hybrids mixing nature (the physical, "objective" world) and culture (the human, "subjective" world), and, second, the recurrent tendency of purification, which attempts to reinforce the epistemological separation of nature from culture, object from subject. At the very moment in history, in other words, that the science wars seem to pit objectivity against subjectivity, the evidence of complicated intertwinings between the two realms seems unmistakable. Latour's contention is that objectivity and subjectivity are modern myths that support a whole host of questionable dualisms, many of which refer directly to science and religion as antipodes (Latour 1999).

Latour proposes to replace these dualistic terms with blended ones, for example the notion of "factish" (combining fact and fetish), which implies that both scientific knowledge and religious belief are fabricated but must

be well fabricated in order to be epistemologically or morally defensible. Science, to Latour, is a craft constructing knowledge of reality; but not just any construct will do, as all scientists know. The operative question to Latour is not "Is it real or is it constructed?" but "Is it constructed well enough to become an autonomous fact?" (Latour 1999, 274). Latour's analysis points out the structural similarity between typical scientific and religious authority. Whereas both are defended in terms of their ostensible autonomy from human construction, to Latour both could be more realistically defended in terms of how well constructed their truths are, acknowledging the relatedness of subject and object as a necessary precondition, not an inevitable weakness.

The vision of nature as culture, then, resonates with a diffuse epistemological position characterizing many of the social sciences and humanities. It has been understood by some as standing in fundamental opposition to science, but it need not be, as long as dualistic caricatures are rejected. On the contrary, this vision poses a powerful means of potentially reconciling the "two cultures" problem of the sciences and humanities (Snow 1987) and bears important potential for bringing science and religion together.

Comparison and Synthesis

Each of the five visions of nature summarized here has significant implications for rethinking science, religion, and their relationship. Even more far-reaching implications are possible if these five visions can be brought into closer dialogue, possibly synthesis. As powerful as they are, their very multiplicity implies their limitations; none can be truly comprehensive unless all are somehow included. To again invoke the story of the blind men and the elephant, we must now attempt to grasp the nature of the elephant itself and not stop at the powerful, differing accounts of its ear, its trunk, its tusk, and its tail. There is an important unity to nature and the reality embraced by science and religion, which we must strive to understand further by bringing these visions into conversation with each other.

There are some important similarities in these visions. All are strong arguments concerning nature in its entirety, not weak arguments concerning certain properties of nature. For example, the evolutionary vision attempts to explain all life, not just certain of its forms or aspects, through the optic of evolution. Similarly, the vision of nature as culture maintains that all knowledge of nature is filtered through cultural lenses, including scientific as well as popular understandings. This common feature poses challenges for synthesizing these visions, as none necessarily includes room for the others. Yet what may arise could be something entirely new for nature, science, and religion.

As strong arguments, each of the five visions challenges a prevalent metaphysical dichotomy. The evolutionary vision stresses the continuity of all nature and, hence, opposes the notion that humans are entirely separate

from nature. The emergent vision not only challenges the reductionist notion that nature at all scales of complexity can ultimately be analyzed in terms of its constituent pieces but, more fundamentally, revisits the larger opposition between chaos (disorder) and cosmos (the order of nature). The malleable nature vision challenges the dichotomy between natural and artificial in that genetic manipulations of nature are arguably both. The vision of nature as sacred challenges the distinction between matter (the stuff of which nature is ostensibly composed) and spirit, secular and sacred. The vision of nature as culture challenges the same notion questioned by the evolutionary vision but takes the opposite tack by means of "culturizing" nature versus "naturalizing" culture.

These five visions of nature are by no means entirely distinct. There has been a good deal of interest, in particular, in bringing together the two scientifically based visions of evolutionary and emergent nature,[11] with important implications for human morality and religion (Goodenough and Deacon 2003). Similarly, the vision of nature as sacred could be understood as a specific claim made by certain cultural groups, thus falling under the vision of nature as culture. In many ways, the vision of malleable nature is the ontological equivalent of the epistemological argument of nature as culture; in one, nature is literally constructed, whereas in the other it is conceptually constructed. Other linkages are possible. Consider the notion of an embodied mind (Varela, Thompson, and Rosch 1993; Lakoff and Johnson 1999), which links the seemingly opposing visions of evolutionary nature and nature as culture, or theological work from an emergentist perspective (Murphy, Russell, and Peacocke 1995; Clayton forthcoming) potentially linking emergent nature and nature as sacred.

Yet there are differences. For instance, the vision of nature as culture can have a corrosive effect on the realist epistemological assumptions underlying evolutionary nature and emergent nature (Hayles 1990; Ruse 1999). Similarly, evolutionary nature may explain, and hence explain away, the vision of nature as sacred (Boyer 1994; 2001; cf. Peters 2002). These differences may suggest important points of departure for a comparative and synthetic effort.

What would science be like, what would religion be like, if we admitted the wisdom of all five visions? These visions point to a biophysical and human nature understood as a consequence of common evolutionary processes, as an emergent reality across multiple scales of complexity, as a complex amalgam of natural and artificial processes, as bearing the sacred features of God or spirit, and as bearing the inescapable features of the cultures that have striven to understand it. If these are some major contemporary visions of nature, what future visions of science and religion may we now imagine that respond to their collective wisdom? This is the very difficult, ambitious, and exceedingly worthy question we must address, remembering that the ultimate reality of nature, science, and religion is probably far

more wonderfully complicated than we will ever be able to grasp. As Sir John Templeton has said in connection with his humble approach in understanding ultimate reality, "Humility [means] admission that god infinitely may exceed anything anyone has ever said of him; and that divinity may be infinitely beyond human comprehension and understanding" (Templeton 2000, 13).

The observations made above do suggest some potential common metaphysical and epistemological characteristics of nature, with important implications for science and religion. At the metaphysical level, nondualism and some form of immanence appear to be preferred over dualism and strict transcendence. At the epistemological level, the twin poles of realism and constructivism yield to a more relational view of scientific and religious truth. This relational view—that truth is not wholly objective nor subjective—helps reframe these visions of nature, science, and religion as inherently metaphorical: as geographer Anne Buttimer has argued (1993), metaphors are powerful, though inescapable, means of apprehending ultimate reality. Ultimately, these potential common features of nature suggest that a science and religion of the future will be built upon a much more integrated metaphysical and epistemological perspective than has existed in the past.

The predicament of multiple visions is faced more generally in the scholarly study of science and religion, given the increasing recognition of plural forms and perspectives. The problem with pluralism is that it is a necessary yet insufficient condition for intellectual progress: at best, it is maximally inclusive of the diverse threads of complex conceptual issues, but at worst it results in a phenomenon of mutual incomprehension. This is precisely the phenomenon captured in the story of the blind men and the elephant.

> The Sixth no sooner had begun
> About the beast to grope,
> Than, seizing on the swinging tail
> That fell within his scope,
> "I see," quoth he, "the Elephant
> Is very like a rope!"

The conclusion to Saxe's poem is appropriate as a conclusion here as well, if only to serve as a guide for what we in the community of science-and-religion scholars should steadfastly avoid. As Saxe summarized:

> And so these men of Indostan
> Disputed loud and long,
> Each in his own opinion
> Exceeding stiff and strong,
> Though each was partly in the right,
> And all were in the wrong!

Notes

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1. For this rendering, see *http://www.noogenesis.com/pineapple/blind_men_elephant.html.*
2. See *http://environment.harvard.edu/religion/publications/statements/joint_appeal.html.*
3. We are doing this at UC Santa Barbara in the context of a new program devoted to this theme. See *http://www.newvisions.ucsb.edu.*
4. See *http://www.santafe.edu; http://necsi.org.*
5. See for example *http://anunda.com/enlightenment/spiritual-emergence.htm; http://www.sedonajournal.com/sje.*
6. See *http://www.ornl.gov/TechResources/Human_Genome/home.html; http://gene-watch.org/bubiodefense.*
7. See *http://www.whybiotech.com.*
8. See *http://www.aebc.gov.uk; http://gene-watch.org; http://www.genetics-and-society.org.*
9. See *http://environment.harvard.edu/religion.*
10. See *http://real.geog.ucsb.edu/esr.*
11. Witness, for instance, a special issue of Complexity International at *http://www.csu.edu.au/ci/vol02/ci2.html.*

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WAS THOMAS AQUINAS A SOCIOBIOLOGIST? THOMISTIC NATURAL LAW, RATIONAL GOODS, AND SOCIOBIOLOGY

by Craig A. Boyd

Abstract. Traditional Darwinian theory presents two difficulties for Thomistic natural-law morality: relativism and essentialism. The sociobiology of E. O. Wilson seems to refute the idea of evolutionary relativism. Larry Arnhart has argued that Wilson's views on sociobiology can provide a scientific framework for Thomistic natural-law theory. However, in his attempt to reconcile Aquinas's views with Wilson's sociobiology, Arnhart fails to address a critical feature of Aquinas's ethics: the role of rational goods in natural law. Arnhart limits Aquinas's understanding of rationality to the Humean notion of economic rationality—that "reason is and ought to be the slave of the passions." On Aquinas's view, rationality discovers goods that transcend the merely biological, viz., the pursuit of truth, virtue, and God. I believe that Aquinas's natural-law morality is consistent with some accounts of sociobiology but not the more ontologically reductionist versions like the one presented by Wilson and defended by Arnhart. Moreover, Aquinas's normative account of rationality is successful in refuting the challenges of evolutionary relativism as well as the reductionism found in most sociobiological approaches to ethics.

Keywords: evolutionary ethics; natural law; sociobiology.

Sociobiology's most prominent voice, E. O. Wilson, recently has attempted to unify all academic disciplines under the rubric of biology (*Consilience,* 1998). Of particular interest to Wilson is the discipline of ethics. Wilson seems determined to fulfill the promise he made decades ago when he remarked that "Scientists and humanists should consider the possibility that the time has come for ethics to be removed . . . from the hands of the

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philosophers and biologicized" (1975, 262). Wilson's approach is indeed ambitious, and ethicists have given a good deal of attention to his work—primarily negative. This may be attributed to Wilson's overly ambitious project and the perceived reductionism that seems inherent in the project.

But Larry Arnhart (2001) has taken Wilson's work seriously and argued that the ethical agenda in *Consilience* could be seen as compatible with a Thomistic account of natural-law morality (NLM) despite Wilson's own protests against any kind of transcendentalist or religious approach to ethics. Arnhart sees in Wilson an approach to ethics similar to the one taken by Aristotle and Aquinas—an approach in which biology plays a fundamental role in any account of human morality. Although the dominant ethical theories of the past century have avoided grounding ethics on human nature and its biology (Moore 1903; Hare 1961), with the advent of sociobiology and evolutionary psychology there has been a renewed interest in exploring the relationship between ethics and biology (Pope 1994; Arnhart 1998; MacIntyre 2001; Ruse 2001).

Arnhart claims that Aquinas's work in ethics seems, at the very least, compatible with recent insights gleaned from sociobiology. Arnhart's primary interests lie in how Aquinas's views on NLM can be supported by Darwinian biology, especially the views of Wilson.

I agree that biology should play a central role in any account of NLM; yet it has often been neglected by contemporary Thomists. The attempt to draw comparisons between Aquinas's moral theory and the results of sociobiology also must take into account the unique role "rational goods" play in NLM. Inasmuch as Arnhart neglects this critical element of NLM, his arguments fail. In the following I begin with a brief account of evolutionary theory with attention to its views on human nature and the questions it raises for NLM. I then consider Wilson's sociobiological account of ethics in *Consilience* as an initial refutation of some aspects of traditional evolutionary theory. Next I consider Arnhart's arguments that purport to base Thomistic NLM on Darwinian biology and his project of reconciling Wilson's work in sociobiology with an ethic based on NLM. I examine the key texts in the *Summa Theologiae* that address the natural law with particular attention to the important role of "rational goods." Finally, I contemplate how a natural-law ethicist might respond to Arnhart's project and the critical questions that evolution raises for NLM.

Evolution and Human Nature

According to Ernst Mayr (2001, 86), Darwin's theory of evolution really consists of five theories: (1) the nonconstancy of species (the basic theory of evolution); (2) the descent of all organisms from common ancestors (branching evolution); (3) the gradualness of evolution (no saltations, no discontinuities); (4) the multiplication of species (the origin of diversity);

and (5) natural selection. According to Mayr, there is a basic plasticity in species because survival requires adaptation. Species descend from common ancestors and must adapt to their own unique environments. Individuals better at adapting survive and reproduce, passing their genes on, while those that don't adapt perish without successfully procreating.

The principle of natural selection requires no special teleological explanation.[1] When asked "Does any process in evolution require a teleological explanation?" Mayr responds with "an emphatic 'No'" (2001, 275). All kinds of teleological explanations "have been thoroughly refuted, and it has been shown that indeed natural selection is capable of producing all the adaptations that were formerly attributed to orthogenesis" (p. 275). Orthogenesis is the belief that biological organisms have the tendency to move on to greater degrees of perfection. However, according to Mayr, no "mechanism could be found to drive" the trend toward perfection (p. 82). "There is no evidence whatsoever to support any belief in cosmic teleology," he claims (p. 82). But on what basis is this statement made—biological considerations or philosophical? He seems committed to the view that biology cannot make the claim, yet he also wants to give biological analysis precedence over any metaphysical claims made by either philosophy or theology, which creates a critical problem. Does biology rule the other disciplines by its own self-proclaimed superiority, or is Mayr simply practicing philosophy without a license?

Mayr's rejection of philosophy and theology seems to be based on the notion that these two disciplines stunted the development of the sciences. Specifically, philosophy and theology advocated a view of nature that could be understood as "essentialism" (p. 74). According to Mayr, essentialism was the dominant view on nature from the earliest Greek philosophers until the time of Darwin. The idea was further developed by Christian theologians who claimed a biblical basis for it (e.g., the references to "kinds" of animals in the Genesis creation narrative). According to Mayr, "Each kind, each type, each species is believed to have been separately created and all now living members of a species are believed to be the descendents of the first pair created by God. The essence or definition of a class (type) is completely constant; it is the same today as it was on the day of Creation" (p. 74). However, Darwin introduced the idea of variable populations in the place of constant classes. Within each population there is a great variety of heritable traits, which enable some to survive and reproduce. This theory of variable populations "was congenial to most naturalists, who in their systematic studies had discovered that species of animals and plants showed as much (and sometimes far more) variation and uniqueness as the human species" (p. 75). This observed variation in species seemed to call into question the fixity that earlier thinkers advocated. Species gradually adapt and evolve based upon the great variation within each species.

The other key problem, which was closely related to both essentialism and teleology, was "finalism." This was the belief that "evolution moved necessarily from lower to higher, from primitive to advanced, from simple to complex, from imperfect to perfect" forms of life (p. 75). The advocates of finalism wanted to introduce into biology a force that aimed at a particular goal. Darwin accepted only mechanistic explanations, and, as Mayr points out, there seems to be no empirical evidence to suggest that these teleological forces are at work in evolution. Agreeing with Mayr, sociobiologist Richard Dawkins also rejects any notion of apparent purpose or design in the evolutionary process.

> Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no mind's eye. It does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of a watchmaker in nature, it is the *blind* watchmaker (Dawkins 1996, 5).

Dawkins and Mayr both represent what has become naturalistic orthodoxy: there is no teleology to be found anywhere in the evolutionary process; the cosmos and its laws operate by chance, not design.

Because there is no teleology operative in evolution, evolutionary processes simply conform to the principle of natural selection. As this applies to human beings, we see that human nature is not constant over time and is simply a temporary phase in a continually evolving process. Thus, traits that may have helped some humans adapt at an earlier time may not later confer an advantage, because climate and environmental conditions may change unpredictably.

In light of this dynamic theory of speciation, Ian Tattersall has argued that moral norms cannot be derived from nature. The basic dynamics of evolution preclude any kind of universal morality based upon human nature. Any attempt to construe nature as providing moral guidelines for human behavior is mere anthropomorphism. Tattersall writes:

> Each society has invented its own ways of coping with economic and social needs, and with the knowledge of individual mortality. What's more, appalled though members of one society may be by ways of doing business in another, no society is intrinsically better or worse than others in any universal sense. We can derive no concepts of morality (a social construct) or of "natural law" (an intellectual construct) from the contemplation of nature (1998, 198).

This perspective on human nature denies any universally normative prescriptions regarding human social arrangements and behaviors. As a result, cultural relativism necessarily follows from the dynamically diverse condition that is humanity.

Tattersall believes that, "As a species, *Homo sapiens* presents a bewildering variety that is next to impossible to boil down to a neat account of anything we could describe as *the* human condition" (1998, 198). On

Tattersall's view there cannot be even the possibility of a human nature since the evolutionary process is always in flux. David Hull concurs with Tattersall and develops the argument in the form of a hypothetical syllogism: "If species evolve in anything like the way Darwin thought they did, then they cannot possibly have the sort of natures that traditional philosophers claimed they did. If species in general lack natures, then so do *Homo sapiens*" (Hull 1989, 74). Thus, if evolution is true, there can be no such thing as human nature.

Contrary to what we might call Tattersall's evolutionary relativism, Wilson believes that human nature has evolved in such a way that very specific activities must be encouraged and others prohibited if societies are to survive. That is, all humans recognize, on some level, universally binding principles that have evolved over millennia and have conferred adaptive advantages.

Wilson on the Consilience of Sociobiology and Ethics

According to Wilson, all knowledge can be brought together and ultimately integrated by science in the ancient Greek tradition of a unified system of philosophy. Wilson proclaims, "When we have unified enough certain knowledge, we will understand who we are and why we are here" (1998, 7). Because sociobiology functions as the unifying system, it follows that ethics will necessarily appeal to biological explanations.

In his discussion of ethics, Wilson makes a sharp distinction between the "empiricist" and the "transcendentalist" approaches to moral inquiry (1998, 261–62).[2] On his view, the empiricists "believe that moral values come from humans alone; God is a separate issue," while the transcendentalists "believe in the independence of moral values whether from God or not" (1998, 261). Accordingly, David Hume, Darwin, and Wilson himself are empiricists, while Kant and theists who subscribe to NLM are transcendentalists.

Transcendentalists frequently appeal to God for the basis of their moral views, because God seems to provide a stable and objective ground for morality that is independent of human experience. Furthermore, the idea of a natural law as the creation of an omnibenevolent God seems to serve as the transcendental basis for morality. Accordingly, Wilson says, "Christian theologians, following St. Thomas Aquinas' reasoning in *Summa Theologiae*, by and large consider natural law to be the expression of God's will" (Wilson 1998, 261).[3] On Wilson's view, any appeal to God must be rejected as lacking consilience with the hegemony natural science holds over all academic disciplines including ethics. But how does Wilson account for the biological basis for human morality?

In order to answer this question Wilson gives a brief summary of how humans must have evolved in order to survive. The genetic basis for the

evolution of human morality is rooted in the problem of social cooperation. As human beings evolved, they required cooperation as a survival mechanism. Natural selection tended to favor those disposed to cooperation. These dispositions were held to be genetically heritable traits that included such social emotions as sympathy, love, guilt, and shame. Over the passage of time, humans developed rules to regulate behavior based on the need for cooperation and the concomitant emotions that had evolved. Thus, raw biological emotions were curtailed by rules that rewarded cooperators and punished violators.

On this view, human nature can be seen as a synthesis of genetic predispositions as altered by cultural norms, both of which are the products of an evolutionary process. In addition to our genes and the role culture plays, Wilson says that our nature is further constituted by "the epigenetic rules, the hereditary regularities of mental development that bias cultural evolution in one direction as opposed to another, and thus connect the genes to culture" (1998, 164).

An example of the natural origins of human morality is the incest taboo. Drawing on the work of the nineteenth-century anthropologist Edward Westermarck, Wilson attempts to demonstrate that cultural taboos on incest are simply normative expressions for avoiding a biologically risky behavior. This taboo, observed across almost all human cultures, seems to be so rooted in human nature that there is a natural aversion to it. Corroborating observations of other primates indicate that incest is exceedingly rare, observed only in primates with abnormal temperaments. While cultures articulate the taboo in various ways, it appears that there is a natural urge to avoid incestuous relations so that, even though cultures vary in the ways they understand "close relatives," they always avoid parent-child and sibling-sibling sexual encounters. But what accounts for this natural avoidance? According to Wilson, there are numerous reasons to avoid incest, because the consequences for the offspring often include damaging or deadly deformities.

The harmful consequences of incestuous relations result from the fact that on any given pair of chromosomes there are two potential sites that carry lethal genes. These sites differ from person to person, but the closer the kinship relation the greater the chances the lethal gene will manifest itself.

> Only one of the two homologous chromosomes in the affected pair carries lethals at the site; the other homologous chromosome carries a normal gene, which overrides the effects of the lethal gene. The reason is the lethality itself. When both chromosomes carry a lethal gene at a particular site, the fetus is aborted or the child dies in infancy. . . . The total effect is that early mortality of children born of incest is about twice that of outbred children, and among those that survive, genetic defects such as dwarfism, heart deformities, severe mental retardation, deafmutism, enlargement of the colon and urinary tract abnormalities are ten times more common. (Wilson 1998, 188–89)

Because the risk to potential offspring is exceedingly high, taboos naturally arise. However, it may be the case also that high parental investment in deformed offspring presents a sociobiological account for the incest taboo.[4] Parents who have deformed children have a higher investment in the deformed child than in other children, thus risking valuable resources on this one child. Furthermore, there is a high probability that the deformed child will not survive, or, if it does, will have a great deal of difficulty reproducing.

Wilson claims that this natural urge to avoid incest indicates an innate tendency to experience moral emotions. These emotions have been shaped and adapted by natural selection with the result that they have become heritable traits all humans possess. The development of various emotions, especially guilt and shame, serves the evolutionary interests of the genes.

These emotions enable us to act for our own individual good and also to cooperate with others in a mutually beneficial manner. Empathy enables us to identify with others of our culture. For Wilson, there is no need to appeal to transcendentalist principles of morality; evolution and empirical science can explain it perfectly well.

Contrary to Tattersall's evolutionary relativism, Wilson's sociobiological views seem to provide a normative basis for ethics in evolution. However, Wilson shares with Tattersall the conviction that teleology is merely an illusion.

Arnhart's "Support" Thesis

Larry Arnhart has argued that NLM would benefit from turning its attention away from the issues that presently occupy analytic philosophers and toward biology as a more helpful resource. Instead of trying to overcome the "naturalistic fallacy," philosophers interested in NLM should examine how humanity's biological nature might assist in making the theory more plausible in a post-Darwinian world. John Finnis (1982) and Robert George (1992), two of the most important contemporary defenders of NLM, both fail to consider biology in any significant way in their apologetic writings on NLM. Arnhart says that Finnis "ignores the importance of biological reasoning in Aquinas's claim that natural law is similar for human beings and other animals, he quickly dismisses this idea in his restatement of Aquinas" (Arnhart 2001, 8). Arnhart rightly argues that this revisionism of Thomistic NLM creates a radical division between humans and other animals, rendering Aquinas's NLM more Kantian than Aristotelian.

In order to turn NLM back to nature, Arnhart looks to Wilson's sociobiological analysis of human morality and believes that it can be reconciled with a Thomistic understanding of NLM. Even though Wilson explicitly rejects any transcendentalist interpretation of moral behavior, his theory of moral sentiments appears to have remarkable similarities with the biological origins of Aquinas's views on natural law.

Arnhart's Analysis of Thomistic NLM

Arnhart claims that the following four points are central tenets of Thomistic NLM:

1. Animals have innate propensities.
2. The normal development of each kind of animal requires the fulfillment of these propensities.
3. Animals with conscious awareness desire the satisfaction of these propensities.
4. Human beings use their unique capacity for rational deliberation to formulate ethical standards as plans of life for the harmonious satisfaction of their natural desires over a complete life. (2001, 2)

Arnhart begins his treatment of Thomistic NLM with the famous passage from the *Summa Theologiae* concerning the origins of the natural law (IaIIae.94.2).[5] In humans, we find three kinds of natural inclinations relative to the three kinds of powers humans possess. Aquinas calls each of these capacities "souls."

Humans share with all organic forms of life the capacity for self-preservation. Aquinas calls this power of the soul the "vegetative soul." In many ways, the vegetative soul functions on a subconscious level. We are not aware, for example, of our white blood cells attacking alien matter in our body, yet the body "knows" that it should do this. So, too, amoebas strive to preserve their own existence by an innate power that has survival as its aim. As Aquinas puts it, "For there is in humans, first, an inclination to the good in accordance with the nature which they share in common with all substances, in as much as every substance seeks the preservation of its own being . . . and by reason of this inclination, whatever is a means of preserving human life, and of warding off its obstacles, belongs to the natural law" (IaIIae.94.2). Humans have a prima facie obligation to preserve their lives. Because life is a basic good, there is an obligation to preserve it. There may be occasions when risking one's life takes precedence over self-preservation, as when defending the life of one's children or of one's community. In these examples, however, the intention is not, strictly speaking, the seeking of one's own death but rather the seeking of some greater good. For Aquinas, what is strictly forbidden is the act of suicide (the intentional destruction of the self), because this runs contrary to the natural impulse toward self-preservation.

Sentient life can be distinguished from nonsentient life by the possession of various sensual appetites: the powers of procreation, fight or flight mechanisms, and the capacity to act upon these desires. Aquinas says, "Secondly, there is in humans an inclination to things that pertain to them . . . according to that nature which they share in common with other animals; and in virtue of this inclination, those things are said to belong to the

natural law which nature has taught all animals, such as sexual intercourse, the education of the offspring and so forth" (IaIIae.94.2). Here Aquinas observes that all animals, humans included, have an innate desire to procreate, care for their young, and fight, if necessary, to defend what is theirs. Food, drink, procreation, and care of one's offspring are all part of what Aquinas calls sensual goods, or, more strictly speaking, "goods of the sensual appetites." They are goods because they are required for our survival, and survival is an important principle of NLM. Because sensual appetites foster survival, there are prima facie duties with respect to how we should pursue them. The ability to distinguish among sensual goods, however, is a sign that a rational power is at work in human nature that potentially can guide and direct behavior.

The human ability to deliberate, judge, and guide activities transcends animal nature. "There is in humans an inclination to the good according to the nature of their reason, which is proper to humans. Thus, humans have a natural inclination to know the truth about God, and to live in society; and in this respect, whatever pertains to this inclination belongs to the natural law: e.g. to shun ignorance, to avoid offending those among whom one has to live and so on" (IaIIae.94.2). Commenting on this passage, Arnhart says that "the human species' uniqueness lies in its capacity for conceptual reasoning as mediated by language" (2001, 7). The capacity for language makes possible the formulation of rules and customs for various kinds of human social activity, especially marriage and family life. According to Arnhart's interpretation of Aquinas, reason enables the human agent to adjudicate among various biological impulses and formulate rules for obtaining these goods in a human community; "human beings use their unique capacity for rational deliberation to formulate ethical standards as plans of life for the harmonious satisfaction of their natural desires over a complete life" (2001, 2). Reason functions as an instrumental means for deliberating how we adjudicate among competing sensual goods. In some dissonance with Aquinas, Arnhart holds that reason has no real goods, or ends, of its own apart from the development of rules for the purpose of "harmonizing of our desires."[6] For example, reason creates rules for social interaction, especially rules concerning marriage and procreation.

On Aquinas's view, marriage functions for three purposes: procreation, raising the young, and companionship. Because marriage has these three purposes, specific behaviors will be prescribed and others will be prohibited. For instance, because procreation is critical, marriage serves an important cultural function in regulating sexual activity. Promiscuity and adultery are forbidden by NLM because they undermine the paternity of the child; if women engage in sexual relations outside the bonds of marriage, men will not have the assurance that the child is theirs and not another's, and this could result in males failing to provide for the children.

Polyandry and adultery, if practiced on a grand scale, would have dire

consequences. If there is doubt concerning the paternity of the child, there is a greater likelihood of low parental investment, and because children require a great deal of care from both parents, many children would die as a result.

Aquinas maintains that sexual promiscuity violates the bond between husband and wife. NLM considers fidelity an important element of the male-female relationship. Humans are seen as bonding for life, and this is to provide familial stability as well as companionship after the children have grown. As Arnhart comments, "rules for marriage provide formal structure to natural desires that are ultimately rooted in the animal nature of human beings" (2001, 5). Thus, reason is instrumentally employed to make moral norms—norms that determine which kinds of behavior, consistent with our biological nature, are appropriate in human relationships.

We can summarize Arnhart's interpretation of Aquinas thus: (1) humans have basic instincts that they share with all other animals; (2) these instincts direct us to the satisfaction of our desires; (3) these desires include, among other things, self-preservation, food, drink, and procreation; and (4) reason functions as an arbiter among these desires and formulates rules for their harmonious satisfaction. NLM is a function of reason reflecting on the biological impulses all humans share. It determines what rules will bring about the greatest satisfaction of desire while simultaneously providing social stability.

Arnhart's Synthesis of Aquinas and Wilson

In order to rehabilitate Wilson's views, Arnhart has focused on the empiricist side of Aquinas's account of NLM. Once the theological component of NLM has been excised, Aquinas becomes much more palatable to the sociobiologists. In summarizing Wilson, Arnhart says, "Once Wilson's biology of moral sentiments is understood as an outgrowth of the natural law tradition, we can envision a recrudescence of interest in the study of natural law rooted in natural science. We might realize that much (if not all) of what Aquinas said about the natural inclinations supporting natural law would be confirmed by modern biological research" (2001, 28). Although much of NLM is clearly rooted in human biology, Arnhart's claim that the entirety of human morality is merely biological certainly cannot be supported by NLM.

The reductionistic approach Arnhart takes to NLM distorts and confuses Aquinas's views profoundly. In his desire to rid Aquinas's theory of theological elements, Arnhart has simultaneously deprived the human person of the dignity that reason bestows. Furthermore, the theistic metaphysic and reason's unique role in human morality provide Aquinas with the basis for the rational goods essential to NLM (Bradley 1997).

In order to make his interpretation more plausible Arnhart appeals to Aquinas's distinction between natural and divine law. He says that "natu-

ral law conforms to the natural ends of human beings as directed toward earthly happiness. Divine law, in contrast, conforms to their supernatural ends as directed toward eternal happiness" (2001, 30). Following Wilson's terminology, Arnhart labels Aquinas's NLM "empiricist," while the theological dimension of Aquinas's ethics, which is based upon the divine law, is clearly "transcendentalist."

By drawing a sharp distinction between natural law and divine law, Arnhart hopes to make NLM acceptable to those who find the precepts agreeable but not the theistic baggage (Lisska 1996). The divine origins of NLM (as the creation of God) and the teleological direction of NLM (with God as the ultimate good) are considered inconsequential. It makes no difference where the precepts come from or what their purpose is, on Arnhart's view. What matters is that NLM provides humans with a kind of moral certitude that is necessary for living in communities with other humans. He concludes: "Aquinas believes that the Christian believer and the Aristotelian philosopher can both look to the laws of nature as a basis for a shared understanding of the world. Similarly, I would argue that today the religious believer and the Darwinian scientist, differing as they do in their worldviews, can each look to the laws of nature as a ground of common human experience that can be known by natural reason alone" (2001, 32). Arnhart's analysis that both Christians and non-Christians can affirm the precepts of NLM is certainly something that all Thomists will grant. Indeed, this is seen as one of the more attractive features of the theory (Finnis 1982). One can further contend that it is precisely the ontological account of NLM that makes it so widely acceptable. Although Arnhart's attempt at reconciling biology with NLM is not novel, his attempt to see NLM as consonant with evolutionary theory seems problematic.[7] My concerns with Arnhart lie in his failure to address in an adequate fashion Aquinas's account of the rational goods.

Aquinas on Natural Law and Rational Goods

Aquinas considers three rational goods central to his theory of NLM that enable him to distinguish it from a purely naturalistic ethic: the desire for God, the need for truth, and the acquisition of virtue. Attention to each of these goods is necessary if we are to understand NLM in its classic sense.

In the passage quoted earlier from the *Summa*, Aquinas says that natural law is the rational creature's capacity to act freely and to direct herself to various activities. It is humanity's participation in the eternal law (IaIIae. 91.2). Unlike the rest of creation, humans are self-directed to their proper ends. This self-consciously purposive capacity is of critical importance to Aquinas's theory of NLM.

There are two ways in which a being can act for an end. In one way a being is directed to its end by another agent, as in the case of an arrow that

is guided to its target by the archer (Ia.3; IaIIae.94.2). In this case, awareness on the part of the guided object is not required. However, in other beings (humans), we find that they possess knowledge of their ends and have the ability to guide themselves to their ends. Thus, NLM is both a *being guided by* basic principles as well as a *guiding of oneself* in accordance with those principles. According to Jacques Maritain, "Since man (*sic*) is endowed with intelligence and determines his own ends, it is up to him to put himself in tune with the ends necessarily demanded by his nature. This means that there is, by the very virtue of human nature, an order or a disposition which human reason can discover and according to which the human will must act in order to attune itself to the essential and necessary ends of human being" (2001, 27).

NLM morality holds that there is an essential human nature—that is, there are actions that objectively contribute to our well-being and others that destroy that well-being—and that part of that essential nature is reason, which oddly enough is a means by which we can choose to act contrary to our nature. No other animals possess this unique capacity.

Among the precepts of natural law, the most important is that "the good is to be done and pursued while evil is to be avoided" (IaIIae.94.2). This precept serves as Aquinas's initial statement of natural law and functions as the basis for all human activity in a formal sense as well as the foundation of all other precepts of natural law.

All the precepts of NLM are based upon human nature.[8] As we have seen, humans have many features in common with all other forms of life. We share the good of self-preservation with both animals and non-animals. We share with sentient animals the sensual goods of procreation, the raising of the young, and so on. Yet, Aquinas also says that humans are unique among all animals. Humans alone possess reason. It is at this point that Arnhart's interpretation becomes problematic.

For Aquinas, the goods of reason transcend the merely biological not merely because reason is able to adjudicate among competing biological desires but because there are goods appropriate to humans *qua* rational. Certainly, the capacity to regulate the biological is a part of reason's functioning. However, Aquinas clearly states that living peaceably with others and pursuing the truth about God are also part and parcel of reason's goods.[9] From Arnhart's treatment of Aquinas's views on marriage, it may be inferred that reason's primary role is to formulate rules to govern marriage and other social arrangements that address our biological impulses. However, as rational beings we pursue goods that are unique to us as rational.

Because humans always pursue their specific desires "under the formality of the good" (*sub ratio boni*), we see that all actions are undertaken with a view to the good. Yet, each individual object is not to be mistaken for the good itself. Accordingly, Aquinas says that we pursue the goods of the sensual appetite not as the good *qua* good but as fulfilling our sensual

nature. As a result, the attainment of our sensual desires can never satisfy us as rational beings. The rational desire for truth, especially truth about God, propels us beyond the merely biological.

As we have seen, the natural law requires that we pursue the good and avoid evil. Yet, nowhere does Aquinas say that the good that we are directed to is solely an earthly good. On the contrary, because the good is the proper object of the will, we always pursue the good, whether it is revealed to us by God through special revelation or through the natural light of reason. The significance of the divine law is that it provides humans with new knowledge concerning their ultimate end. The natural law never ceases to function in our pursuit of the good. Indeed, the rational goods include the desire to know truth about God. The natural law leads us to an understanding of God that transcends the capacities of unaided human reason.[10] This relationship of natural to divine law is somewhat complex, but what we should understand is that there are not simply two separate realms of ethics, the natural and the supernatural, that are governed by two separate and distinct laws. Both natural and divine law concern our duties to one another in this life, and both direct us to God. However, the epistemological basis for each is different, and so too is their efficacy. The natural law helps us in this life and directs us to that which is truly fulfilling, while the divine law, as grace, completes this task in a more perfect fashion. Yet, both kinds of law instruct humans how to govern their lives according to reason.[11]

The Thomistic principle "Grace does not destroy nature but perfects it" (Ia.1,8) resolves the tension between the naturally known principles of natural law and the revealed precepts of divine law. Divine law does not replace natural law. It merely serves to elucidate further what the genuine human good is and how it can be pursued. Yet, reason can also be considered, to some degree, without reference to God's ordinances (Lisska 1996).

Because human agents are rational creatures, they require certain kinds of activities for their flourishing. Among those activities are the acquisition of virtue, the need to know the truth, and the pursuit of the good. In fact, according to Aquinas, truth and goodness are intimately related:

> Truth and good include one another; for truth is something good, or otherwise it would not be desirable, and good is something true, or otherwise it would not be intelligible. Therefore, just as the object of the appetite may be something true, as having the aspect of good (for example, when someone desires to know the truth), so the object of the practical intellect is the good directed to operation, under the aspect of truth. For the practical intellect knows the truth, just as the speculative, but it directs the known truth to operation. (Ia.79.11)

In this passage an underlying teleology informs both the act of knowing and the act of desiring. Truth is the object of the intellect, and goodness is the object of the will. Because both of these faculties constitute the rational soul, they must function together in any properly human activity. So it

is in understanding the natural law to be true that we are able to pursue the good. But in seeking the truth we are already pursuing the good. This is the reason why Aquinas says that truth and good include one another.

Truth is a rational desire we possess for two reasons. We need to know the truth about God in order to achieve perfect happiness, and we need the truth for more mundane matters—to enable us to distinguish between objects that harm us and those that help us. And because a good deal of our lives depends on a discernment that far exceeds the capacity of biological instinct, we must develop our rational capacities to their fullest.

These critical rational capacities include understanding, deliberation, and willing, because we are beings that require knowledge and freedom in order to survive and flourish. In this important sense we are said to be responsible for our behavior while other animals are not. Yet, our rational capacities also enable us to regulate, to a great extent, our biological impulses. The acquisition of virtue is the means by which we regulate and direct ourselves to the various goods.

Aquinas says that whatever pertains to reason also falls under the domain of the natural law. Although he never develops an elaborate list of the primary precepts of natural law, we see that any operation of the intellect toward the good is properly related to the natural law. So it is that the intellectual appetite pursues the truly human goods. Indeed, "By the intellectual appetite we may desire the immaterial good, which is not apprehended by sense, such as knowledge, virtue, and the like" (Ia.80.2, ad2).

Reference to the acquisition of virtue is especially important to our discussion. Natural law serves as the basis for our moral drives but does not spell out the details of moral behavior. This is the reason Aquinas's theory of natural law requires a theory of the virtues. Roughly, we may say that anything that pertains to reason is a matter of NLM, and the acquisition of virtue is a function of reason; it follows that the acquisition of virtue is prescribed by the natural law. Aquinas addresses this aspect in more detail at IaIIae.94.3, where he considers whether all acts of virtue are prescribed by the natural law. He writes, "Since the rational soul is the proper form of the human, there is thus in every human a natural inclination to act according to reason; and this is to act according to virtue. Thus, all the acts of the virtues are prescribed by natural law, since each person's reason naturally dictates to that one to act according to virtue."[12] The key point here is that all the acts of the virtues fall under the sphere of the natural law because they are prescribed by reason (IaIIae.94.3).[13] However, the natural law does not dictate precisely how one is to act according to reason. For Aquinas, the natural law simply indicates what specific kinds of actions are per se good and which are evil. He does not delineate in his NLM just how one goes about determining what kind of behavior is required. Indeed, the natural law determines what Aquinas calls the "object of the act" (IaIIae.18.1). One must not only know what kind of act is required in any

given moral situation; one must also act for the right purposes and in the right circumstances. Natural law does not simply provide prima facie obligations; it also requires the development of virtue, which enables a person to act consistently for the right reasons and in the right circumstances.

NLM and the Challenge of Evolution

We find three different views operating on the questions of teleology and human nature. The traditional Darwinians (Mayr and Tattersall) deny both teleology and a universal human nature. Wilson denies teleology but accepts the view of a universal human nature due to evolutionary constraints. NLM embraces both teleology and the universality of human nature.

From the foregoing analysis, Thomistic NLM seems to be compatible with an account of sociobiology that avoids the naive metaphysical materialism that Wilson and the traditional Darwinians offer. Specifically, sociobiology offers a theory of human nature that applies universally to the entire species of *Homo sapiens*. Yet, we must still address the problems of evolutionary relativism and the teleological issues raised by the traditional Darwinians.

The challenges to NLM presented by Tattersall and Mayr constitute significant but hardly unanswerable questions for NLM. Tattersall's contention that there is "no human condition" can be refuted by two kinds of arguments. The first is what we might call the biological argument that Wilson presents. There are some behaviors, such as incest avoidance and nurture of the young, that are shared universally among humans. If society of any kind is to survive, these two principles must be at work among humans given how the facts of genetics affect the offspring of closely related individuals and how human infants take such an inordinate amount of time to mature.

The second argument against Tattersall's evolutionary relativism is what we can call the philosophical argument. Philosophers James Rachels (2002) and Michael Ruse (2001), both ardent Darwinians, reject relativism on the basis of social cooperation, a view that Wilson also holds. For social cooperation to take place there must be universally binding moral principles. According to Rachels, because humans are social animals, at least two moral principles apply necessarily and universally (2002, 25–26). The first is the principle of nonmalefescence, which holds that in order to cooperate all members of a community must agree not to harm other members of that community. The second principle is the principle of honesty: in order to be members of the community, all must speak truthfully in their promise not to harm others. Without these two principles no human society is even conceivable. These two arguments seem sufficient to refute Tattersall's evolutionary relativism.

The problem of teleology remains. There are at least two ways we can discuss teleology: biologically and philosophically. As we have seen, traditional Darwinians reject teleology as outdated and superfluous. Yet, even within the system that apparently has no purpose, it seems as if some of the parts are designed for very specific purposes. Yves Simon asks, "How is it that every time a biologist speaks of teleology, he calls this notion all sorts of names: primitive, archaic, pre-scientific, foreign to science, anti-scientific? Then he would look at his watch and say, "Goodbye, I have to go to the dentist," which implies that teeth have a function to fulfill and that they can fulfill their function satisfactorily or not—and thus we are back to a firm belief in finality" (1992, 47).

Etienne Gilson points out that "The adaptation of an organism to its surroundings and to its conditions of existence, and those of parts of an organism to other parts of it, are intelligible only from the point of view of their final result. That is what ad-apted means" (1984, 83). But even if these teleological arguments in biology are not conclusive, it certainly does not follow that teleology has no place in metaphysics.

The deeper problem for biologists is that, if teleology is relegated to the sphere of philosophy, most biologists are simply incapable of discussion. In metaphysical and moral matters teleology still contributes significantly. When a person kills her neighbor, we want to know why. A variety of explanations could be given, but unless we can determine the intention of the agent, which can only be a teleological principle, we cannot ascribe guilt or innocence. If the intent was to protect her innocent daughter from the neighbor's attack, we have determined the purpose of her action. Or perhaps her intent was to collect an inheritance. Teleological factors determine the moral value of the act. In the one case we have a morally praiseworthy action, in the other a morally despicable one. Yet, moral and philosophical analysis does not preclude the role of biology in explanations of human behavior.

Final and efficient causes are not mutually exclusive. We may appeal to both. Natural instinct might supply efficient causes, while reason may provide the teleological cause of the act in question. Biological evolution may provide an efficient causal explanation for human behaviors, but it does not follow that the biological explanation is the whole story (Lemos 2003). Clearly, philosophical explanations may be required for an adequate understanding.

Even though Mayr and Dawkins explicitly deny the validity of teleological explanations in biology (which is open to debate), they simply do not have the resources to deny supplemental or complementary philosophical explanations. We may consider this in the following dilemma:

1. If biology is a science, it does not engage in metaphysics. Therefore, Dawkins and Mayr cannot complain about philosophers who want to raise teleological questions in metaphysics.

2. If biology is an "explanation of everything," they are obligated to provide a sophisticated metaphysic of their own. But they do not do this.
3. Either biology is a science or it is more than a science.

Therefore,

4. It must either remain silent about metaphysics or provide a much more comprehensive account of reality.

Mayr and Dawkins cannot have it both ways. Either they need to limit their remarks solely to the domain of the natural sciences or they need remedial work in metaphysics. Henry Plotkin has observed that those like Dawkins and Mayr who work in the empirical sciences often move from their own spheres of expertise into metaphysics without pausing to consider the philosophical value of their claims. Plotkin specifically criticizes the sociobiologists' tendency to do this when he writes, "Underlying all the biological and social sciences, the reason for it all, is the 'need' (how else to express it, perhaps 'drive' would be better) for genes to perpetuate themselves. This is a metaphysical claim, and the reductionism that it entails is . . . best labeled as metaphysical reductionism. Because it is metaphysical it is neither right nor wrong nor empirically testable. It is simply a statement of belief that genes count above all else" (1998, 94).

One could ask Mayr's question here: Where is the empirical mechanism that substantiates this claim? Because there is none, we can only assume that Dawkins and Wilson have subtly shifted the arena for the argument to metaphysics.

One final problem for both the more traditional Darwinian views and Wilson's sociobiology is the epistemological problem Darwin himself raises. In his 1881 letter to W. Graham, Darwin asks one of the most difficult questions anyone can ask of a naturalistic metaphysic. "The horrid doubt always arises whether the convictions of man's mind, which has developed from the mind of the lower animals, are of any value or at all trustworthy. Would any one trust in the convictions of a monkey's mind, if there are any convictions in such a mind?" (1958, 68) If the human mind has simply evolved in the way it has to survive, it has no independent source of truth. J. B. S. Haldane observed the same problem half a century after Darwin when he wrote, "If my mental processes are determined wholly by the motions of atoms in my brain, I have no reason to suppose that my beliefs are true . . . and hence I have no reason for supposing my brain to be composed of atoms" (1927, 209).

Any purely naturalistic system of explanation cannot account for its own veracity. Del Ratzsch points out this embarrassing situation all naturalists must face sooner or later when he writes, "One question becomes inescapable: How does one give a non-circular *naturalistic* justification for

the cognitive faculties we employ in science—that is, a justification, recognition of the rational adequacy of which does not itself rely on precisely the cognitive faculties whose justification is at issue?" (2004, 75) All naturalist attempts at proving the coherence and veracity of their own views must have as a basic assumption the validity of the reasoning process. But this is precisely the issue that requires a proof! Thus, naturalism cannot produce any arguments that prove it to be true. Only a philosophical anthropology that gives reason the capacity to know truth and not merely to be shaped by blind evolutionary forces alone is up to the task.

According to Hilary Putnam (1983), reason always and irreducibly functions in a normative capacity and not merely as an evolutionary advantage for some members of the human species. All cultures use reason, at the very least, in an interpretative fashion. Of necessity, we pursue the truth, and reason guides and shapes how we come into possession of it. This is an unavoidable aspect of being human. Any attempt to explain away reason as merely the product of pure naturalism is an absurd self-referential attempt to deny humanity's unique thinking capacity. Reason is evidence of humanity's unique place in a world of beings guided solely by instinct and mechanism, and any attempt to deny this is simply a "self-refuting exercise if ever there was one" (Putnam 1983, 246). Putnam contends that reason always has a normative role to play in human thinking; it cannot be reduced to mere blind adaptation. He writes, "Let us recognize that one of our fundamental self-conceptualizations . . . is that we are *thinkers*, and that *as* thinkers we are committed to there being *some* kind of truth, some kind of correctness which is substantial. . . . That means that there is no eliminating the normative" (p. 246).

Richard Swinburne has argued that a purely materialist metaphysic cannot account for the normative role that reason plays in human affairs. That is, materialism simply confuses scientific explanations with ultimate explanations. Accordingly, evolution may give a scientific explanation for how humans come to possess a disproportionately larger brain than other animals, but it cannot give an ultimate explanation for this or for why humans have true beliefs (Swinburne 1996, 60). The normative function of reason must transcend purely biological and evolutionary explanations of how we have come into possession of a capacity that enables us to do metaphysics.

Aquinas's appeal to the goods of reason plays a critical role in resolving this problem. Among the goods Aquinas lists, we find the natural desire for truth. Yet this desire is not what we would call a biological desire but a rational desire.

Human activity depends on reason knowing the truth. Indeed, truth is a basic need for humans, since much of our well-being depends on knowing the truth. Dallas Willard writes, "Truth is . . . a vital human need, and a major part of what makes knowledge valuable. It and its opposite, falsity,

are squarely at home in the midst of ordinary life. To know what truth is and to be able to recognize it and its opposite are basic components of ordinary human competence" (2000, 34).

Aquinas says that there is a natural teleology in the process of knowledge. This is why he sees the true and the good as convertible terms. That is, one must know what is truly good, not simply what seems to be good. Only a rational agent is capable of making the distinction between real and apparent goods. Real goods complete, or perfect, the agent. Peaceful coexistence with others, contemplation of the truth, and love of God truly perfect the agent. Seducing one's neighbor, squandering one's talents, and the shameless glorification of self never fulfill human desires. In order to *do* the good, one must first *know* the good. A being whose intellect has been formed only by the processes of blind evolution cannot make this distinction. However, a being that is capable of genuine rational thought can and must make these distinctions.

Conclusion

Traditional evolutionary thought attacks NLM on two fronts, denying teleology and advocating evolutionary relativism. The latter seems to be refuted by Wilson's sociobiological account of morality. Humans have evolved in specific ways with the result that some behaviors must be rejected universally as contrary to adaptation. The denial of teleology, at best, can be made only within the context of biology. In the domain of philosophy teleology still functions in a robust manner.

Arnhart has attempted to reformulate Aquinas's NLM in light of Wilson's sociobiological ethics. Although a NLM can be reconciled with some version of sociobiology, Arnhart's account falls seriously short of a coherent theory of NLM that is faithful to the spirit of Aquinas. The critical problem is a failure to adequately understand what Aquinas means by rational goods, and as a result the NLM he defends seems to be more consistent with the moral philosophy of Hume rather than that of Aquinas.

Aquinas's account of NLM is considerably more complex and nuanced than Arnhart presents. According to Arnhart's definition of NLM, "human beings use their unique capacity for rational deliberation to formulate ethical standards as plans of life for the harmonious satisfaction of their natural desires over a complete life" (2001, 2). In Arnhart's presentation, it becomes apparent that reason plays only an instrumental role in Aquinas's "naturalistic account of morality." Reason is merely the capacity for deliberation concerning how we adjudicate among various sensual goods.

Without an analysis of how reason regulates the biological impulses, we are left to what might best be called "Thomistic emotivism." By this I mean that Arnhart has placed Aquinas in the company of those who see our natural inclinations as the primary impulse behind all our activities.

Although lip service is paid to the role of reason, it becomes apparent that reason merely formulates rules that enable us to act upon our biological desires. This is reminiscent of Hume's statement "Reason is, and ought to be, the slave of the passions" (1951, 415). But then we are left with Mary Midgley's question (1998, 184), "How is it (reason) supposed to know which of them to obey? Slaves have a bad time in such circumstances."

Arnhart fails to see that for Aquinas there is a clear distinction between the biological, or the material, and the natural (IaIIae.10.1). The biological is concerned with our vegetative and sensual powers, which we share with all other animals. However, *nature*, while admittedly an ambiguous term, has a more specific meaning. It refers to the specific nature of the entity in question. Not only rocks, trees, and squirrels, but also humans, angels, and God, have a "nature." Nature, therefore, encompasses much more than the merely biological.

Arnhart's attempt to unify the science of sociobiology with the NLM of Thomas Aquinas is a laudable project. However, such an approach must address Aquinas's broader concerns for the rational goods. The results of our study are the following: If Arnhart wants to be faithful to the NLM of Thomas Aquinas, as he says he does, he must develop a more adequate account of what Aquinas means by rational goods. If Arnhart wants to be true to the sociobiology of E. O. Wilson, he needs to abandon Thomistic NLM.

Notes

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1. Darwin himself harbored doubts about evolution destroying final causality. In a letter to W. Graham as late as 1881 he wrote that "the existence of so-called natural laws implies purpose. I cannot see that. . . . But I have no practice in abstract reasoning, and I may be all astray. . . . Nevertheless you have expressed my inward conviction, though far more vividly than I could have done, that the universe is not the result of chance" (Darwin 1958, 62).
2. Wilson consistently uses the terms *transcendentalist* and *transcendental* with reference to an objective and independent source of morality apart from human nature. Kant would be a transcendentalist; so too would Plato and Augustine. No technical philosophical sense of the term *transcendental* is intended by Wilson.
3. Wilson's naivete regarding Christian ethics becomes all too apparent here. First, Aquinas would say that ethics is quite clearly based upon the nature that God has created. As a result, Aquinas could to some degree be considered an empiricist. Second, natural-law morality rarely makes any appeal to "the will of God." Wilson has unwittingly conflated divine-command ethics with natural law. For analysis of Aquinas's views on the role of divine will and intellect in Aquinas's natural-law theory see Boyd 1998.
4. This argument is my own based upon parental investment theory. While it is not one of Wilson's arguments in *Consilience,* it clearly is one that can be used by the sociobiologist.
5. All translations of Aquinas are my own.
6. Arnhart fails to mention the natural desire for truth, virtue, and God in his discussion of Aquinas's discussion of the goods proper to the rational soul. This omission plays a significant role in my treatment of his views on NLM later in this essay.

7. I am here borrowing the term *consonance* from Ernan McMullin, who has used the term with reference to how Christians can understand the workings of primary and secondary causes in science and in philosophy (see McMullin 1981).

8. On Aquinas's view, this human nature is clearly the creation of God. Aquinas says, "Supposing that the world is ruled by divine providence, it is manifest that the whole community of the universe . . . is governed by divine reason. Thus, the very notion of the government of things in God, the ruler of the universe, has the nature of law" (IaIIae.91.1).

9. Although Arnhart quotes Aquinas's reference to the human pursuit of "the truth about God" in his "Thomistic Natural Law" (2001), he makes no mention of it as being a particular rational good. In his *Darwinian Natural Right* he does address the issue of religion as a rational good, but its importance is relegated to a generic desire to "make sense of everything" (1998, 267–75).

10. Aquinas says that all people have the natural urge to know the truth about God and have the ability to discover elementary truths about the creator. But this knowledge is not sufficient for salvation (IaIIae.3.5; also see Porter 1986).

11. On the relation of divine and natural law see Porter 1990; 2000.

12. Aquinas says that the virtues are good habits that perfect the various powers of the soul. Thus, there are intellectual virtues that perfect the rational powers of the soul. Included in these virtues are understanding, wisdom, science, prudence, and art (IaIIae.57). The moral virtues perfect the appetitive powers of the soul and must be shaped by human reason and its grasp of the peculiarly human goods (IaIIae.60). In the case of both types of virtue, reason, not instinct, understands what the good is and guides the agent to its proper end.

13. For further discussion on the relationship between virtue and natural law see Bourke 1974.

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ALTRUISTIC CELIBACY, KIN-CUE MANIPULATION, AND THE DEVELOPMENT OF RELIGIOUS INSTITUTIONS

by Hector Qirko

Abstract. Building on a model first proposed by Gary Johnson, it is hypothesized that religious institutions demanding celibacy and other forms of altruism from members take advantage of human predispositions to favor genetic relatives in order to maintain and reinforce these desired behaviors in non-kin settings. This is accomplished through the institutionalization of practices to manipulate cues through which such relatives are regularly identified. These cues are association, phenotypic similarity, and the use of kin terms. In addition, the age of recruits and their contact with actual kin are factors that relate to kinship recognition and that are similarly manipulated by institutions in order to reinforce altruistic behavior directed toward non-kin. Support for this set of predictions is presented from historical and ethnographic sources on monastic life in Buddhism, Christianity, and Hinduism, as well as Islamic dervish groups, the Essenes, Shakers, and others. Potential implications of the model for understanding the development of religious institutions are preliminarily explored by reviewing Joachim Wach's model of religious developmental stages as well as some of the literature on the relationship between individualism and communalism in incipient religious organizations, in light of the kin-cue manipulation model.

Keywords: altruism; celibacy; Darwinian evolutionary theory; kinship recognition cues; manipulated psychology; religious institutions.

The Kin-cue Manipulation Model

Gary Johnson has suggested in a series of papers (1986; 1989; Johnson, Ratwick, and Sawyer 1987) that human altruism for the benefit of non-kin, particularly in the contexts of military volunteerism, combat, and suicide, might be reinforced by the manipulation of the means through which

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individuals identify kin. His argument is both powerful and simple: research on inclusive fitness strongly suggests, both theoretically (Dawkins 1979; Hamilton 1963; 1964; Hughes 1988) and empirically (for some reviews, see Alcock 1998, 561–99; Bourke 2001; Emlen 1995; 1997; Jennions and Macdonald 1994; Komdeur and Hatchwell 1999), that individuals of many species will sacrifice fitness for others if the coefficient of relatedness among them is sufficiently high. However, kinship can be ascertained only indirectly, by means of cues, and cues necessarily permit the possibility of error and manipulation. In human beings, the cues most likely to apply are association (where familiar individuals, especially during development, are kin)[1]; phenotypic matching (where a physical or behavioral "template" is innate or learned and those who match it are kin)[2]; and, of course, kin terms[3] (for more on altruism and kin recognition see Alexander 1990; Fletcher and Michener 1987; Hamilton 1964; Hepper 1991a, b; Sherman and Holmes 1985). Thus, military institutions might reinforce altruistic behavior by training recruits in extremely close and intense proximity; causing them to resemble each other as much as possible by means of uniforms, identical haircuts, and so on; and using identifying and rhetorical language characterized by such kin terms as "mother country" and "brothers-in-arms." Johnson and others (e.g., Badcock 1987; Balch 1985; Coser 1974; Crippen and Machalek 1989; van den Berghe 1981) have suggested that religious, political, and other organizations make use of similar means to reinforce desired altruistic behavior among members.

In my research (Qirko 2001; 2002), I have built upon this work by developing a model involving the three cues discussed by Johnson and two associated factors. These factors are the age of recruits (essentially, the younger the better, based on the likelihood that learning in many domains involves development-related sensitive periods; e.g., Belsky, Steinberg, and Draper 1991; Draper and Harpending 1988; Hurford 1991) and attachment theory (the likelihood that separation from kin will facilitate kin-cue manipulation; this based on research suggesting that severed attachments can be relatively easily replaced; e.g., Ainsworth 1977; Dontas et al. 1985; Sagi et al. 1985). In order to test predictions derived from this model I have focused on celibacy, or lifelong sexual abstinence, primarily because in Darwinian terms it belongs to a class of altruistic behaviors that may be called *terminal*. That is, if one foregoes reproduction for a lifetime, no benefit can be personally incurred that will outweigh the resulting loss of fitness, and no reciprocal benefits can be obtained at a later date. These facts limit the number and power of alternative Darwinian and other theoretical positions (such as cost/benefit assessments and risk strategies) that potentially apply to celibate behavior. In addition, celibacy in institutionalized settings is clearly altruistic, because organizations enjoy its benefits in at least two ways. First, the time and energy that would be devoted to

reproduction, parental care, and care for relatives are sacrificed, not for offspring and other close kin, but for others in the organization, including leaders as well as abstract and supernatural entities. Second, the practice helps ensure the organizational control of wealth and other resources, because celibate members are likely to have fewer conflicts of interest with respect to acquiring, preserving, and distributing resources (Balch 1985).

Thus it can be hypothesized that non-kin institutions demanding celibacy of their members will utilize kin-cue manipulative practices. Specifically, these institutions should:

- encourage close association that replicates natural kin contexts (particularly parent-child and sibling relationships).
- encourage the use of false phenotypic matches (uniforms, emblems, hair styles, speech patterns, mannerisms, and so on).
- encourage the use of linguistic and other symbolic kin referents.
- attempt to obtain young, impressionable recruits.
- discourage association with actual kin.

This predicted pattern has been tested using George Murdock and Douglas White's sample of 186 societies (1969), in which cross-cultural descriptions of celibacy were sought and compared. Cases of institutionalized celibacy (institutions as defined in DeLamater 1987, accompanied by socially defined, consistent statuses and roles) were found in 41 different contexts in 32 sample societies. Of these, 26 contexts were non-kin (that is, celibacy was not practiced in individual or in family settings). These non-kin contexts included the major religions as represented in several societies, as well as the Vestal Virgins of Rome, "Amazons" of Dahomey, Aztec priestly class, Inca "Virgins of the Sun," and others. While data are often sketchy, the predicted pattern of institutional practices associated with kin-cue manipulation was found in the majority of cases (see Qirko 2001, 2002).

A complementary means through which to assess the value of the model, and the focus of this essay, is a historical analysis of religious institutions in which celibacy is present. Below are summaries of the typical institutional practices pertaining to celibacy found in Buddhist, Christian, and Hindu monastic settings, Protestant celibate groups, the Essenes, and Islamic dervish groups. While some of this material may be familiar, the context of kin-cue manipulation theory in which it is presented reveals a potentially important pattern. All of these institutions, irrespective of ideological, historical, and geographic settings, similarly exhibit non-kin membership, connections between celibacy, altruism, and important institutional objectives, and the predicted specific institutional practices related to the manipulation of kin-recognition cues.

Celibacy and Kin-cue Manipulation in Religious Institutions

Buddhism. The *Pratimoksa*, the written code of behavior for Buddhist monks and nuns, is fundamental to both Indian Buddhism and the forms subsequently exported elsewhere (Yamagiwa and Silk 1994). One of its most important provisions is a prohibition against sex (Horner 1982a). While Buddhist branches began adding and supplanting *Pratimoksa* precepts as early as the fourth century (Tsomo 1994), voluntary celibacy has remained an important component of monastic behavioral codes throughout the Buddhist world.

Typically, lay societies receive spiritual guidance from monks and in turn provide, through patronage, land grants, and other gifts, the resources for building and maintaining monasteries. The monks' daily subsistence requirements are similarly underwritten. Wealthy patrons provide for the more ambitious and at times opulent monasteries that have characterized Indian Buddhism in later centuries. "The contributions [by laity] are so numerous, so frequent, and so varied in size and content (cash, food, clothing, utensils, or labor) that it is very difficult to determine how much of its income a family may contribute in a year" (Ingersoll 1966, 66; see also Nash 1963).

Melford Spiro (1970) describes two categories of property in Buddhist monasticism. The first is corporate, wherein all belongs to the order. The second is personal, made up of gifts given to individual monks. These gifts, ranging from the small and commonplace to land, money, and sometimes even monasteries themselves, revert to the order upon the death or departure of the individual and cannot be transferred to kin or laity (see also Bunnag 1973, 103; Ingersoll 1966). Thus institutions can become wealthy, while the opportunities for individual members to keep or pass on portions of that wealth are limited. In addition, a monk's relatives typically benefit very little, in material terms, from his entering a Buddhist institution. When a young boy is dedicated to the church, his family often earns religious merit, but not resources. Giving up a child does "reduce the number of mouths to feed in the family" (Yalman 1962, 326) but this benefit is often outweighed by associated expenses for the initiate's clothing, ordination, and ritual meals.

Traditionally, "going forth," or becoming a novice, occurs at roughly age fifteen, although ordination, or final admission, is prohibited before the age of twenty. Initiates renounce ties to kin, take new, shared names, and perform work in service of higher-ranking monks and the community. Whether in monasteries, begging, or on pilgrimages, they associate only with fellow recruits or monks. Visits to family members, often in villages far from monasteries, are controlled, discouraged, and occasionally proscribed.

Spiro's description of Buddhist monastic life in Burma in the 1960s (1970; see also Pfanner 1966) shows that the general pattern described in the Pratimoksa continues to apply. Celibacy is reportedly rigidly adhered to. While ordination occurs only after age twenty, novices can be as young as eight, and some "small novices" can enter the institution even earlier. Ordination involves vows of poverty, chastity, and homelessness, and the candidate attests to being free, solvent, and of sound mind and body. He brings to ordination his begging bowl and uniformly yellow robes. With the consent of his family, he "dies a civil death" and divests himself of all possessions and rights to inheritable resources (Spiro 1970, 291).

Separation from kin and lay society is accomplished not only by residence in a monastery but "by diacritical features of dress and personal appearance" (Bunnag 1973, 34). Clothing is so uniform that "disfigurement" of robes by means of a small dark dot is necessary to make them individually identifiable (Horner 1982b, 407). Similar regulations apply to begging bowls (Horner 1982b, 113–15, 119). In addition, Buddhist monks traditionally shave their heads on the eve of each holy day, or roughly four times a month (Horner 1983, 27, 239, 261).

Monks are known as "Sons of the Buddha." In the many cases where kin cannot afford ordination and subsequent costs and a sponsor is obtained, the monk calls the sponsor "my father" or "my mother." According to Spiro, "it is no accident . . . that the parental image is explicitly and especially evoked" (1970, 343).

The pattern with respect to female celibates is somewhat different. Nuns are generally subject to harsher discipline (Auboyer 1965) and are not equivalent in status to male ascetics, falling somewhere between laity and monks (Horner 1982a; Spiro 1970). However, they typically conform to the general model of practices and behavior outlined above.

Hinduism. Three of the four stages of the ideal life in Hinduism are characterized by celibacy (Goergen 1974). In the first, the young student (eight to twelve years old) moves in with his teacher, or *guru*, for at least twelve years of discipline and celibacy. The name of this stage, *bramacarya*, is Sanskrit for celibacy. The second stage is characterized by an active social life, including marriage and family, where sexual activity and the pursuit of descendants is required (Elder 1990). While most remain "householders" for life, a few move on to the third stage and live as hermits, removed from social life. Spouses may enter this stage together, but they are to live as celibates. The fourth stage involves complete isolation and meditation.

Some Hindus, however, skip the householder stage and become monks or nuns, maintaining the celibacy of their early years. An important condition underlying this choice is that "aspirants should take to it before they have tasted sex in ordinary course and settled down as married men and

women" (Ghurye 1964, 21). Such an alternative is mentioned in sacred texts as early as 900 B.C.E. However, the first clear evidence of sectarian, settled ascetics appeared around 400–500 C.E., and by the seventh century distinguishable branches with distinctive clothing and practices were described by foreign visitors. The first Hindu monasteries, which arose around 788–820 C.E., are traced to the influence of the ascetic Sankaracarya (Ghurye 1964).

Sankaracarya, following the model of Buddhist and Jain monasteries, established membership rules, initiation vows and rituals, and administrative structures still in use today (Ghurye 1964; Elder 1990). His goal was to provide "freedom from the bother of wandering" (Ghurye 1964, 85), and orders were to rely upon lay communities' contributions for survival. He organized ascetics into ten orders, each marked by a suffix added to all members' names. Soon a class of younger attendants was formed to help provide for elder ascetics and to physically provide for the monasteries. Each center was assigned a territory from which to draw resources and recruits. Not surprisingly, competition among centers soon followed, with concomitant attention to in-group identification through clothing, language (e.g., greeting formulas), initiation rituals, and other practices. This emphasis on markers denoting membership continues today. For example, novices among the *Samnyasis* (Siva followers) are told to let themselves be "taught," not by the particular doctrines or even by their masters, but by their distinctive membership badges: their yellow robes, the removal of their top-lock, and so on (Ghurye 1964, 93).

The various ascetic branches appear to conform to the kinship manipulation model in other respects as well. Members are initiated, typically while quite young. (In the words of one informant, "one is never too young to enter upon a good path" [Oman 1973, 264].) After receiving their distinctive clothing and insignias, the initiates become either permanent residents of a monastery or wandering mendicants. Even the wanderers gather during the rainy season and associate only with their own. Members of orders generally "must disclaim kinship ties with [forefathers] as well as with the living" (Bhattacharyya 1953). In many groups, members receive new, identical surnames (Oman 1973). Other kin symbolism abounds; for example, hailing the Lord as "father and mother" is common (Narayanan 1990, 168).

Religious property is often considerable and is corporately held. Local laity contribute cash, buildings, lands, labor, and food (Oman 1973, 250). Religious trusts are passed on within the groups and "neither [property] nor its management is divisible among members of the family" of the contributor (Oman 1973, 253). As in Buddhism, merit is accrued proportionate to the efforts and resources contributed. This is often discussed in sacred texts, and merit promises salvation not only for individual contributors but also for their ancestors and descendants (Oman 1973).

The general pattern is illustrated by the *Dasanami* order, which is more than one thousand years old and one of the most respected and influential orders in India and elsewhere (Dazey 1990). Family, clan, and lineage structure are the central organizing principles of the group. Divided into the ten ascetic lineages that trace their ancestry to Sankaracarya, all members of each lineage share the same name. A larger subdivision, a *gotra*, which includes several lineages, also has distinctive, shared names for its members based on its founding sage. These names are used for "mutual recognition" and are "especially useful when on pilgrimage to distant and unfamiliar areas" (Dazey 1990, 290). Disciples of the same teacher are called *guru-bhai* (guru brothers), and a senior monk taught by the same teacher of one's guru is *caca-guru* (uncle guru). The *Dasanami* organization thus "parallels that of a biological lineage or 'family tree'" (Dazey 1990, 292).

Lynn Teskey Denton (1991) worked with female ascetics in the city of Varansi. Roughly two-thirds are "celibate students" who extend the first, or student, stage of life into a lifelong status. The pattern is consistent with that of males with respect to the kin-cue model. All permanent students live organized and controlled lives in "convent-like establishments," overseen by "Mother-Teachers," where they worship and perform service. They tend to be young (average age, 23), wear distinctive haircuts and styles of dress, and go out only in chaperoned groups.

Christianity. Since its early history, the Christian Church has been characterized by one form or another of voluntary vows of sexual abstinence. The first written law on abstinence for priests was issued by the Council of Elvira in 305 C.E. (Cholij 1989; de Valk 1990). Roman Catholic priests today are required to observe a "total and irrevocable" commitment to sexual abstinence (Napier 1989). In the Eastern Church, individuals can be married before ordination as priests but must swear abstinence as a prerequisite to clerical duty. Bishops and those who take monastic vows must be chaste.

The New Testament gives as instructions for an ascetic life: ". . . hating one's father and mother, forsaking one's family, becoming a eunuch for the kingdom of God and renouncing all possessions . . ." (in Linge 1990, 44). Wandering charismatics who followed these instructions spread the gospel and organized householder Christianity. By the early second century, this wandering proselytism was viewed with suspicion by many settled Christians and was replaced with churches and clergy.

The Christian Church increased enormously in size between the third and fifth centuries (becoming the official religion of Roman society in the fourth century), concomitant with the call by an ecclesiastical elite for celibacy (Osiek and Balch 1997, 155). In addition, the ease in travel provided by Roman order facilitated an increased pool of potential recruits.

Thus "the virtually simultaneous appearance of Christian empire and cenobitic monasticism is . . . no accident" (Linge 1990, 46; see also Coser 1974, 150; Frazee 1998, 11).

Throughout the centuries, the rules of Christian monastic life—as developed and refined by Pachomius (Rousseau 1985), Saint Benedict of Nursia (McCann 1963), Lanfranc (Knowles 1951), and others (e.g., Matson 1998; Symons 1953)—consistently stressed obedience and selfless service to the institution, its leaders, and God. They also stressed each of the predicted institutional practices associated with kinship manipulation. Pachomius's words are instructive: "He who makes progress in the *Koinonia* [community] with purity, obedience, humiliation, and submissiveness, and puts no stumbling-block or scandal before anyone by his words or by his acts, that one will grow rich forever in imperishable and enduring riches" (in Rousseau 1985, 90).

While the monks were kept poor, the monasteries of Pachomius accrued so much wealth that it even troubled Theodore, his eventual successor (Rousseau 1985, 158).

The typical institutional pattern in the Christian Church is of immature recruits, averaging age fourteen to fifteen (though many are younger), who are separated from relatives to live in near or total isolation with other recruits and members. Orders are characterized by uniform clothing, hairstyles, and accouterments even where there is no contact with outsiders and social identification is not an issue. Behavior is similarly homogeneous, including, for example, vows of silence or constant prayer in both individual and group settings (Timko 1990). The use of kin terms and other symbols of kinship to refer to members and authority figures permeates all aspects of daily life (Wynne 1988).

As early as Pachomius (fourth century), all elements of this pattern were in place. Contact between members of monastic "houses" within a community was forbidden without permission, as was contact between monasteries. "Brothers" who had to travel could not do so alone, nor could they speak of what they had seen upon their return. Visits with family members were strictly controlled. Members, many of whom entered as young boys, wore uniforms with belted tunics, goatskins, and hoods marked with monastery and house insignias (Rousseau 1985, 82).

In the sixth century, Saint Benedict warned that "monks should not have even their bodies and wills at their disposal" (McCann 1963, 85). Parents dedicating young children to monastic service had to agree to withhold resources from their children as well as to forfeit any gifts from them. Letters from parents were read first by abbots (McCann 1963). And Benedict's prologue to his rules amply illustrates the use of kin terms: "Hearken, my son, to the precepts of the master and incline the ear of thy heart; freely accept and faithfully fulfill the instructions of a loving father" (McCann 1963, 7).

Priests were trained under similar circumstances (for example, with respect to kinship symbols, they were typically given new biblical names, and bishops were called husbands of the church [Coser 1974, 157]). Militarized monastic orders created to fight in the Crusades, such as the Hospitallers, Templars, and Teutonic Knights, also conformed to the patterns described above (Barber 1994; Seward 1972). While nunneries were less common historically and their practices are less well documented, the general pattern of kin-cue manipulation applies to female recruits as well (Burton 1994, chap. 5).

George Hillery Jr. (1992), in his description of Trappist-Cistercian abbeys and monasteries in the 1970s and 1980s, shows that the historical association between altruism and institutional kin-cue manipulation remains today. Members take five vows: of poverty (owning nothing), chastity (total sexual abstinence), obedience, stability (not leaving the monastery unless directed to do so by the abbot), and conversion of manners, with a commitment to prayer and the spiritual life (Dudley and Hillery 1979). Candidates are usually very young men who remain novices for two to five years. Members have only limited contact with their families and wear distinctive uniforms within and outside the monastery walls. Kinship roles, with associated terms, are an integral part of the social structure. As noted by Samuel Rubenson (1995, 49), "it is obvious that the monastic theology and the sets of rules shaped before the [C.E.] 380s have remained the foundation of monasticism until today."

Protestant Sects. Protestant reforms, beginning with Martin Luther in the early sixteenth century, were primarily spurred by opposition to celibate and monastic aspects of the Catholic Church (Ozment 1972). However, celibacy was (and is) still occasionally practiced in Protestant communal organizations, and manipulation of kinship recognition cues appears to have accompanied it.

The Shakers are perhaps the best known example of a Protestant celibate sect. Founding their first settlement in Albany, New York, in the mid-1770s, the sect by 1826 had established nineteen communities and additional branches in the United States. Women typically outnumbered men, and equality of the sexes was always an important component of Shaker ideology. Commitment to celibacy appears to have been extremely consistent, with few known infractions (Kitch 1989; Muncy 1973). Members were required to give all their property to the organization (Kitch 1989, 88). Clothing was identical within orders and genders (Andrews 1963).

Shakers advocated "nonsexual, affectionate, sibling love" as the purest love on earth. Members referred to themselves as "brothers," "sisters," and "siblings in Christ" and lived in communal houses as "families" (Kitch 1989, 87). Children who entered the sect with their parents lived apart

from them and were cared for by non-kin. Leadership was explicitly modeled after parental roles: "Supervisors in the Shaker family system treated their workers as loved children of God" (Kitch 1989, 88). The founder of the Shakers, "Mother" Ann Lee, wrote: "I am married to the Lord Jesus Christ. He is my head and my husband, and I have no other" (Muncy 1973, 19). The degree to which separation from kin was attempted is illustrated in a typical song:

> Of all the relations that ever I see
> My old fleshly kindred are furthest from me
> So bad and so ugly, so hateful they feel
> To see them and hate them increases my zeal
> O how ugly they look!
> How ugly they look!
> How nasty they feel! (Edward D. Andrews, in Kanter 1972, 83)

Other celibate Protestant sects, such as the Zoarites, Harmonists, and Sanctificationists, exhibited the predicted pattern of kinship manipulation (Kitch 1989; Muncy 1973). All demanded close association among members and carefully regulated social contacts with nonmembers. They insisted on uniform dress, utilized kin terms and symbolism, and showed a willingness to accept, if not an outright preference for, young recruits. Celibacy in these institutions was explicitly implemented to curb individual and familial self-interest and to promote altruistic behavior toward the community and its leaders (e.g., Kanter 1972; Muncy 1973; 1988; van den Berghe and Peter 1988).

Judaism–Essenes. As described by the best available early sources, Philo Judaeus, Flavius Josephus, and Pliny the Elder, the Essenes were a Jewish religious order that existed roughly between the second centuries B.C.E. and C.E. in present-day Syria and Palestine. It had, at its peak, approximately 4,000 members. Marriage was apparently forbidden and celibacy the norm for many (Baumgarten 1996; 1998; Vermes and Goodman 1989). New members handed over all property to supervisors. They worked in various occupations "with zeal, like athletes" (Philo Judaeus, in Vermes and Goodman 1989, 27) and shared earnings communally.

The Qumran community, known only through Dead Sea Scrolls, is likely to have been Essene (Zias 2000). The "standard" hypothesis is that Essenes lived near Qumran ca. 200 B.C.E.–68 C.E., after which Romans destroyed their community, and that it is their manuscripts that constitute the Dead Sea Scrolls (Stegemann 1992; but see Baumgarten 1996). The Scrolls' descriptions of Qumran closely parallel Essene life (Stegemann 1992), and, although there is no explicit mention of celibacy, researchers think it likely that here, too, at least some (e.g., Qimron 1992) and perhaps all (e.g., Zias 2000) members were abstinent.

Although not confined to monasteries, Essenes lived in commonly occupied and supervised houses. Philo Judaeus states that "no house belongs to any one man; indeed, there is no house which does not belong to them all, for as well as living in communities, their homes are open to members of the sect arriving from elsewhere" (in Vermes and Goodman 1989, 23). They shared communal meals twice a day (Baumgarten 1997; Stegemann 1992) and are likely to have lived and traveled only in close association with each other.

Albert Baumgarten (1997, 55; also Vermes and Goodman 1989) reports that each Essene carried "distinctive marks of membership," including a loincloth, a white garment for meals, and a small shovel for use after defecating in remote places. "Easy and certain recognition" was one consequence of their wearing "special uniforms" (Baumgarten 1998). Josephus noted that all Essenes, even leaders, dressed identically (Baumgarten 1997). Further, Josephus, Philo, and others referred specifically to "the analogy of kinship/brotherhood" regarding Essenes (Baumgarten 1998, n. 1). Members could help support the needy but not their own relatives without special permission (Vermes and Goodman 1989). A Qumran scroll fragment suggests that supervisors (or "Overseers") considered "loving one's relatives" an offense (Eshel 1994).

Josephus wrote that Essenes "disdain marriage for themselves, but adopt the children of others at a tender age in order to instruct them; they regard them as belonging to them by kinship, and condition them to conform to their own customs" (Vermes and Goodman 1989, 39; see also Beall 1988).

Dervish Sects. While Islam, like Judaism, is far more "pro-natalist" than Christianity (Reynolds 1986), asceticism, including celibacy, has always been a strong, if secondary, movement in this religion (Bellamy 1979). The dervish groups of the Middle Ages (thirteenth–sixteenth centuries), particularly in non-Arab Islamic areas, practiced total renunciation of societal norms (including kinship) coupled with "deliberate and blatant social deviance" (Karamustafa 1994, 3). They appear to have had a symbiotic relationship with the institutionalized Sufism that arose at roughly the same time but did not demand renunciation in general or celibacy in particular (e.g., Lewis 1969, 140–54). Rejection of marriage, reproduction, and, in most cases, sexual activity was a prerequisite for following the (exclusively male) dervish paths (Karamustafa 1994, 16). While some individuals often joined for temporary periods, many remained dervishes for life.

The various dervish groups were characterized by seasonal wandering and begging coupled with community life in *tekkes*, or religious hospices. Highly organized begging and patronage led to many hospices being "veritable institutions dependent upon carefully managed economic surpluses and subject to political control" (Karamustafa 1994, 15). One Abdal *tekke* was "mosque, hostel, hospice, refectory, and center of pilgrimage in one." It housed more than two hundred members and servants and "apparently

never ceased to receive financial support from the central government" (1994, 77).

All groups were characterized by distinctive, uniform styles of appearance. The Haydaris, for example, wore long beards and long hair, dressed in sacks and sheepskins, and wore iron rings on their ears, necks, wrists, and genitals. The Abdals went naked except for a felt or iron covering over their genitals. They had shaved heads and beards, and their bodies were decorated with burn spots and drawings of snakes. They carried hatchets, leather pouches, anklebones, begging bowls, and large yellow spoons. Abdals also carried musical instruments, which they played while screaming (Karamustafa 1994, 68, 71).

Membership was heavily youth-oriented, and founders were often young elites who continued to received parental support as dervishes. Dervishes "took a special interest in adolescents and young men," who appear to have been "exceptionally responsive" to their calling (Karamustafa 1994, 94). Founders and current masters were referred to as "fathers," and groups referred to themselves as "families."

Summary. The preceding brief review of the major religions and their offshoots lends support to the prediction that voluntary vows of lifelong celibacy occurring in non-kin contexts will be accompanied by the institutionalized manipulation of kinship recognition cues. There are three components to this support. First, the specific organizations described are primarily associations of unrelated members and recruits. Only the Shakers and other small Protestant sects appear to have actively recruited related initiates, and it is significant that in these cases every attempt was made to minimize the potentially disruptive impact of kin-based relationships. While in many organizations individuals, especially higher ranking ones, sometimes utilize the resources and status they derive from celibacy and organizational membership to provide benefits to their kin (e.g., Betzig 1995), clearly benefits are primarily and usually channeled to other, unrelated members or to the organization itself.

Second, celibacy in these organizations is clearly altruistic. In all cases, membership requires the voluntary surrendering of personal and family resources. Attempts to gain additional personal resources are foreclosed. Further, the sacrifice of time and labor by initiates is directed to the organization as a whole, specific group leaders, and supernaturals. Celibacy is explicitly discussed in religious doctrine, in statements by leaders and members, and in direct observation by researchers as being an important, if not essential, component of individual sacrifice. All of the major institutions discussed here, even the most ascetic, are highly organized and successful at acquiring resources from recruits and nonmembers. Most important, these institutions accumulate and preserve these resources, at least in part, by demanding and reinforcing vows of celibacy.

Third, the predicted institutionalized practices associated with kin-cue manipulation are generally present. All of the organizations reviewed rely on close association of members and institutional replication of family roles (even where wandering or missionary work is important); the severing or restricting of ties with nonmembers, particularly biological relatives; and the use of kin referents. A willingness, if not preference, for young recruits is present as well. Finally, all groups demand uniformity in dress and other accouterments and behaviors. Notwithstanding a great deal of variety in doctrine and structure of different orders, branches, and sects, these five predicted practices generally remain constant.[4]

Implications for the Development of Religious Institutions

These findings spur preliminary thinking about the relationship of kin-cue manipulation and practices to the development of religious institutions. An argument can be made that an important step in the development and success of any religious or other institution that demands sacrifice from unrelated members is the adoption of such practices to maintain and reinforce desired behaviors. Another brief look at many of the same institutions already reviewed, this time from a more explicitly developmental perspective, is useful to support this contention.

J. Patrick Olivelle suggests that the "anti-culture" of ascetic renunciation began in northeast India around the sixth century B.C.E. in the company of demographic changes driven by a shift to intensive agriculture:

> . . . early village-based tribal organization gave way to relatively large kingdoms under the absolute authority of monarchs. Centralized political authorities made travel relatively safe and easy, facilitating commerce and creating a rich and powerful merchant class. The economy became more complex and integrated, and there was greater contact and communication across a relatively large area of North India. Urban centers grew especially around the capitals of kingdoms. (Olivelle 1990, 129)

Two traditions arose within early Hinduism. One was the path of the sedentary hermit, soon obsolete but idealized. The other was that of the itinerant mendicant, which survived and became increasingly organized. Renouncers abandoned their families and places in a strict caste system and began to associate in non-kin groups. Vows of celibacy and poverty became central organizing principles. Dress was not uniform at first but simply symbolic of renunciation (by not being white, the normal societal color).

It is clear that these mendicant groups became viable only after the demographic changes outlined earlier took place. Only with a large pool of potential recruits, increased travel and communication, and a mainstream society capable of providing resources to renunciants could these groups

survive (Olivelle 1990, 142–44). Once these conditions were met, charismatic leaders could attract groups of recruits whose loyalty they could require and maintain through effective organizational practices (Elder 1990, 30). Typically, after the charismatic figure was gone, a group would fade away, but some persisted. Because of the great variety in rules, patterns, and traditions, "A fascinating study could be done of those factors that contribute to the survival and growth of an *asrama* following the death of its founder" (Elder 1990, 31). Because of the likelihood that a pool large enough to provide recruits would consist of unrelated members, the effective reinforcement of desired behavior through kin-cue manipulation is possibly one such factor.

Similarly, organized monasticism developed in Christianity when it became the official religion of Roman society and when the ease in travel provided by Roman order yielded an increased pool of potential recruits. Philip Timko (1990) describes three patterns in early Christian asceticism: anchorites, who lived alone; semi-anchorites, who, although also living alone, formed a close and constant association around a "spiritual father," usually in a church; and cenobites, usually near towns and cities, who owned property, worked farms or herds, and provided religious services to the neighboring communities. Strict discipline and communal organization characterized the latter two groups.

Buddhism arose through the influence of an individual charismatic who organized his religious movement as the ever-increasing number of disciples demanded it. The first section of the *Mahavagga* begins with the night of the Buddha's enlightenment and discusses various issues pertaining to the "development and stabilisation of the Order as a uniform institution" (Horner 1983, xiii). The Buddha becomes aware that the practice of monks' bringing recruits to him for personal ordination has become unwieldy, and he permits monks to ordain others themselves "in any quarter, in any district" (Horner 1983, 30).

> And thus, monks [says the Buddha] should one let go forth, should one ordain: First, having made him have his hair and beard cut off, having made him put on yellow robes, having made him arrange an upper robe over one shoulder, having made him honour the monks' feet, having made him sit down on his haunches, having made him salute with joined palms, he should be told: Speak thus: "I go to the awakened one for refuge, I go to the *dhamma* for refuge, I go to the Order for refuge." This formula was repeated two more times. (Horner 1983, 30)

Eventually this too became logistically demanding. Candidates began to be presented by a preceptor to the Order as a whole for ordination. Thus Buddhism, developing in populous northeast India ca. 530 B.C.E., also depended for its success on regulating the behavior of its increasing number of recruits.

Even among the smaller-scale Islamic dervish groups, an original pattern of individualistic mendicancy was often supplanted by community

life. Individual renunciants, typically in urban settings, succeeded in attracting followers, and random begging was replaced, in some cases partially and others almost completely, by highly organized group collection of resources and gifts from patrons (Karamustafa 1994). This was accompanied by aspects of kinship manipulation discussed earlier.

It seems evident that the pattern of kinship manipulation found within these religious institutions correlates with the size and lack of relatedness of the pool of potential recruits. In Christianity and Hinduism, where no single charismatic leader initially fueled the development of organized, cenobitic life, this pattern developed only after population sizes and geographic mobility significantly increased. In the case of Buddhism (and Jainism; see Dundas 1992), the presence of a large and ever-growing number of (unrelated) followers aligned with a specific leader created the need for effective internal organization. Thus, the institutional practices pertaining to kin-cue manipulation exhibited by these religious institutions may be related less to particular ideological or cultural contexts than to problems associated with institutional cohesion, and their occurrence in so many contexts a result less of diffusion than of the shared psychological dispositions of members and recruits.

Joachim Wach (1962), in a cross-cultural analysis of the relationship between religion and society, describes a number of conditions necessary for the development of "specifically religious" groups. First, there must be population increases in the relevant "sociological unit—family, clan, or tribe" (p. 109). There must additionally be social stratification with respect to the ownership of property, occupations, and ranks. Finally, leaders, responding to momentous events like wars or plagues, must break from the traditional conservatism of their groups. A new group can then appear, "characterized by the concept of relationship as spiritual fatherhood and spiritual brotherhood" (p. 110). The nature of the new, usually magical or religious, experience sets members apart from the rest of society, although "motives such as lust for power and desire for health, wealth, or protection do characterize the more degenerate forms of secret societies" (p. 116). Membership in these organizations is not automatic; tests of some sort must be passed. Admission is typically symbolized by "'death' and 'rebirth,' rejuvenation, perhaps the choice of a new name, and knowledge of the secret language" (p. 117).

Wach's description of the three stages in development of American Indian religious groups illustrates this developmental process (as does research on the development of Western cults; e.g., Hood et al. 1996, 315–19). First, outstanding, charismatic individuals gather followers; next, progressively more complex organizational structures emerge; and finally, stratification within the organizations occurs. Wach sees a similar process in the development of major religions. Individual personalities obtained disciples

who were willing to sacrifice for them ("permanent helpers," as Max Weber characterized them [1964, 60]). "Ties of family and kinship and loyalties of various kinds [were] at least temporarily relaxed or severed" (Wach 1962, 135), and life in the groups was integrated by means of rites and religious practices such as prayer and meditation. Upon the death of the founder, the "circle" of helpers became a brotherhood, after which, with increasing membership, previously simple rules and rites were extended. Discipline became more important, which eventually led to the formation of an ecclesiastical body and the distinguishing of clergy. "Here and here alone," concludes Wach, "the term 'institution,' often loosely used, can rightfully be applied" (1962, 144).

While manipulation, psychological or otherwise, is not addressed by Wach, his perspective, as well as the history of specific institutional developments as summarized earlier, suggest a model related to altruism and the manipulation of kinship recognition cues. Individuals in any society may choose celibacy and other forms of renunciation for idiosyncratic or culture-specific reasons. If these individuals and/or their embraced religious ideologies possess qualities that are attractive to others, and if a sufficient number of unrelated followers are gained, methods to organize and provide for the growing membership become necessary. It is at this point, when individual renunciation becomes a communal, altruistic act, that the pattern of kinship manipulation should appear. Celibacy, while by no means universal, is a common part of ideology and practice in these contexts, because control of sexuality is an important means through which institutions direct energy, time, wealth, and other resources from individuals and their kin to the organization and its non-kin members and leaders.

Altruistic sacrifice such as celibacy may in fact be required by developing organizations as a key to their survival. Here, too, reinforcement of individual sacrifice would be maintained through kin-cue manipulation. Research into sect development provides additional clues concerning the historical formation of institutions that demand celibacy and other forms of altruistic behavior in non-kin contexts. Pierre van den Berghe and Karl Peter (1988) find that communal groups typically succeed or fail based on their ability to control individual self-interest and self- and kin-based relationships. Through celibacy, many groups attempt to minimize the effects of "the two most powerful and ubiquitous bases of special relationships: kinship and sex" (1988, 523). Noncelibate groups such as the Hutterites and Kibbutzim typically succeed only when they modify central aspects of their communalist ideology to accommodate individualism and familism.

The tension between individualism and communalism in developing organizations is repeatedly observed. For example, the Amana Society (or Community of True Inspiration), which moved to the United States from Germany in 1843, attempted to deemphasize the family by valuing (although not requiring) celibacy. Kin bonds and individualism nevertheless

reasserted themselves after 1900. By 1932, when members voted to change from a socialistic community to a joint-stock corporation, "families in the new Amana immediately took on characteristics of families outside Amana" with respect to economic consumption (Andelson 1983, 61). The Children of God, founded in California by "Papa" Berg, were originally strongly, and efficiently, communal. However, Rex Davis and James Richardson (1992) describe the problems in the group that resulted from its initially young recruits marrying and having children. Individuals spent more time and energy in familial concerns and less in meeting organizational goals.

In some cases, organizations combat individualism and familism through the control, rather than the prohibition, of sexual expression. In the Oneida Community, a group founded in New York State in 1848, founder John Humphrey Noyes oversaw a system of "complex marriage," wherein all members considered themselves wed to each other and regularly exchanged sexual partners (Foster 1995). Oneida members lived, worked, and raised their children communally, and all property was held in common. Noyes's strategy was explicitly implemented to curb "special love," or romantic attachments, that could threaten this communal organization. By 1879, the system of complex marriage was abolished due to both internal and external pressures. Only two years later, "the group also officially gave up its communistic system of economic organization, reorganized as a joint-stock corporation, and went on to become one of the most successful small businesses in the United States" (Foster 1995, 54). Another example is the Unification Church, where founder Reverend Moon, known as the "True Spiritual Father," attempted to promote and maintain selfless commitment to the organization by requiring his approval for all marriages, and, in many cases, personally matching marriageable pairs. Over time, commitment lagged, and an organizational strategy suffered as a result of "the endemic tension of individual and collective needs in communal groups" (Bromley et al. 1982, 128).

Overviews of Protestant and other sects such as those described above (e.g., Galanter 1993; Muncy 1973) suggest the widespread use of kin-cue manipulation. Communal living is characteristic, and members often refer to each other by means of kin terms (Galanter 1993, 124). Constraints are often established over all facets of communication, and charismatic groups also establish their "distinctive character" through dress, custom, and ideology. Members when recruited are usually young. It is no coincidence that deprogramming—the techniques utilized to remove and resocialize group members—is ideally accomplished with the strong involvement of kin. Galanter proposes a "biologically grounded inclination among individuals to coalesce into such groups, particularly when ties to other sources of affiliation are weakened" (1993, 122). It seems likely that the interest individuals have in maintaining ties with non-kin in these contexts is facilitated by the manipulation of kinship-recognition mechanisms

and that the successful implementation of institutional practices that reinforce those ties has a great deal to do with organizational survival and development.

Discussion

There are several alternative possible explanations for the apparent correlation between institutions demanding celibacy of their members and the predicted pattern of kin-cue manipulation. One is simply the diffusion of institutional practices in religious settings. There is no doubt that the major religions have influenced each other throughout their development and that their practices are often transferred to new and different contexts. However, cultural traits associated with religious institutions do not tend to diffuse en masse but more often according to their locally perceived utility and congruence with existing cultural patterns, as established theoretically (Barnett 1953; Rogers and Shoemaker 1971) and borne out by a large number of syncretic and other religious movements throughout the world (e.g., brands of Catholicism in Latin America; see Gossen 1997). Even granting the likelihood of trait diffusion, the question of why the particular traits associated with kin-cue manipulation continue to be maintained in so many settings remains. This is particularly true given that the traits in question are an interrelated set derived from an independently developed model.

Another possibility is that factors other than the reinforcement of celibate behavior account for these institutional practices. For example, Rosabeth Kanter (1972) has argued that sacrificial behavior in religious organizations, rather than requiring reinforcement, itself reinforces commitment. A more recent evolutionary variant of this argument emphasizes the cost of many institutional practices as a signal of commitment to intragroup cooperation (Cronk 1994; Sosis 2000). As Richard Sosis has put it, "celibacy is one of the costliest signals imaginable!" (2000, 7). However, that very point may most directly illustrate a potential problem with the costly signal theory. Celibacy, given its terminal nature in terms of individual fitness, is too costly to have evolved, in either cultural or biological terms, to serve as a signal in this manner. "Handicap" signals arise because they promote individual fitness relative to survival and reproduction (Grafen 1990; Zahavi and Zahavi 1997); thus they cannot be so expensive as to preclude the goals they have been selected to achieve. It is more plausible that celibacy is one of a number of altruistic practices that, because of both the sacrifice they entail for the individual and the benefits they provide the organization, are typically institutionally reinforced. Alan Grafen's discussion of the difference between signal (where both signaler and recipient benefit) and manipulation (where only one party benefits) is potentially instructive in this context (1990, 535).

Several other evolutionary models related to altruism in general might apply to celibacy in particular. One is reciprocity, either direct (Trivers 1971; 1985) or indirect (Alexander 1987). However, as in the case of costly signaling, the currency of celibacy is too expensive, at least in evolutionary terms: there seem to be no benefits that could be returned to a celibate individual involved in a reciprocal relationship. Inclusive fitness is often highly relevant, and several researchers have shown how celibacy can be a familial strategy to minimize parental investment in offspring when cultural circumstances such as inheritance laws (Betzig 1995; Boone 1986) or resource stress (Low 2000) render it practical. However, even when indirect benefits accrue to a family by a celibate's removal from its material and reproductive concerns (Hager 1992) or by means of the celibate's increased status as a member of a celibate institution (Alexander 1979, 80), the daily maintenance by individuals of vows in non-kin settings still requires explanation. Trait-group selection (e.g., Sober and Wilson 1998a), to the extent that its effects might differ from those of kin selection, could be relevant as well; at present, while often assumed in the context of human behavior, it remains controversial (Sober and Wilson 1998b; Trivers 1998). Other relevant, evolutionary-minded models include mate competition (Dickemann 1997) and population-wide reproductive strategies (Reynolds 1986). All of these, and others, are likely to play some role in the development of institutional practices in religious contexts, as of course are more typically discussed historical, political, and economic factors. It seems clear, however, that the role of kin-cue manipulation as a basis of religious institutional practices to reinforce altruistic behaviors is a complementary one that warrants additional research. (For one approach focusing on the relationship of kin recognition to the evolution of religion, see Crippen and Machalek 1989).

Conclusion

I have explored the potential role of non-kin altruism in the behavior of members of religious institutions, the organizational practices that appear to reinforce that behavior, and the implications of both with respect to the development of religious institutions in general. I have not discussed religious institutions on the basis of specific ideology, ritual, or myriad other possible criteria (e.g., Verkamp 1995). Obviously, there are many powerful individual and cultural rationales for religious belief and practice and many potential factors involved in religious affiliation or conversion (Snow and Machalek 1984). And, of course, this research does not contradict the possibility that human beings act in ways that benefit others for altruistic reasons without coercion or deceit.

However, it does suggest that there may be aspects of human psychology that are similarly identified and manipulated in a variety of organizational settings in order to reinforce sacrificial acts such as celibacy. Additional

steps are clearly necessary to further test this possibility. These include reviewing materials on additional cases of institutionalized celibacy; exploring ways in which stratification, gender, and other variables impact celibacy and its reinforcement in institutional contexts; conducting ethnographic analyses to learn more about the impact of kin-cue manipulation on the daily life of celibates; and more rigorously comparing the developmental history of institutions where celibacy does and does not occur.

It is important to remember, however, that the predicted pattern of kin-cue manipulation is likely to apply not only to religious organizations with celibate members but also to religious, military, political, social, and other organizations demanding many different classes of altruistic behavior from recruits. Celibacy is only one example, however powerful, of the many demands that religious and other organizations might make, and attempt to institutionally reinforce, on recruits and members.

In fact, vows of celibacy need not be of primary importance to institutions manipulating kin recognition among members. For example, while a dramatic example of altruism in military contexts is altruistic suicide in battle, it is unlikely to be of primary concern to military organizations. Obedience, group cohesion under stress, and willingness to risk lives while engaging the enemy are much more important objectives (Henderson 1985). Yet some of the processes through which these behaviors are reinforced may also encourage acts of terminal altruism.

Similarly, it is likely that the avoidance of marriage, and therefore heirs, as well as the harnessing of individual resources and labor, are prime institutional objectives in institutions demanding celibacy of their members. Yet the means through which these behaviors are maintained can reinforce as well the reproductive sacrifice inherent in sexual abstinence. Any type of sacrifice for unrelated others in institutional settings should be expected to be facilitated by reinforcement, in that competing individual and familial interests can jeopardize the meeting of institutional goals. Thus, however difficult this may be to operationalize, the best future tests of kin-cue manipulation theory will likely require analyses of various classes of altruistic behaviors as well as comparisons of institutional practices in more generally altruistic versus non-altruistic contexts.

Notes

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1. Although indirect, perhaps the best support for the importance of association as a human kin cue is found in studies of Israeli *kibbutzim*, where children reared together tend to avoid each other sexually (Shepher 1971; Talmon 1964), and in Taiwanese arranged marriages, where the practice of rearing children together and forcing them to marry often results in sexual dissatisfaction (Wolf 1995; see also Brown 1991, 118–29; van den Berghe 1983).

2. Two promising lines of support in this area are the increasingly large literature on human face–recognition modules (e.g., Gauthier and Logothetis 2000; Kanwisher 2000; Wilson 1987) and research on paternity confidence and infant appearance (e.g., Christenfeld and Hill 1995; McLain et al. 2000).

3. Obviously, kin terms do not necessarily correlate with actual genetic relationships. However, individuals appear to be generally aware of the genetic relationships that underlie kin nomenclature (Alexander 1979; Chagnon 1979; 1988; van den Berghe 1981). As summarized in Daly, Salmon, and Wilson 1997, all societies exhibit ego-centered kinship terminology based on parent-offspring relationships and distinguish between genders, generations, and degree of relatedness. These universal linguistic categories pertaining to kinship, potentially an aspect of the innate structure of language (Pinker and Bloom 1992), perhaps signal the existence of a kinship recognition cognitive module, and reinforce the likelihood of kin terminology and related symbolism as powerful indicators of relatedness. In addition, shared names, suggesting kinship relations, appear to positively influence helping behaviors (e.g., Johnson, McAndrew, and Harris 1991; Oates and Wilson 2002).

4. There are, of course, exceptions. Geoffrey Moorhouse (1969, 65–68) describes the celibate Little Brothers and Sisters of Jesus, who live in groups of usually no more than five, take jobs in the workplace, and wear ordinary clothes. The Community of the Glorious Ascension, an Anglican men's celibate order, while typical of the predicted pattern in most respects, permits novices access to, and disposition of, their money and property (pp. 102–3). Some variability will apply to all of the major religions and their offshoots, particularly given the controversy historically accompanying celibacy in Christianity and Buddhism.

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THE SCIENTIFIC STUDY OF RELIGION: ITS CONTRIBUTION TO THE STUDY OF THE *BHAGAVADGĪTĀ*

by Arvind Sharma

Abstract. The *Bhagavadgītā* is a popular Hindu text containing eighteen chapters. It begins with the hero, Arjuna, showing a marked unwillingness to engage in combat on the eve of battle. He is finally persuaded to do so by Krishna, who is an incarnation of God. Krishna actually reveals himself as such to an amazed Arjuna in the eleventh chapter. The fact that Arjuna does not immediately heed Krishna's advice to engage in battle after Krishna's sensational self-disclosure has long puzzled students of the text. It is only at the end of the eighteenth chapter that Arjuna finally shows his readiness to fight. In this essay I argue that the discussion of the nine primary sensory states by Eugene d'Aquili may help resolve this issue and thus provide an instance of a case in which modern scientific study of religion enhances our understanding of a religious phenomenon, as a corrective to the usual charge that it must invariably diminish it.

Keywords: Arjuna; *Bhagavadgītā*; Krishna; negative affect; neutral affect; positive affect; primary sensory state; *Weltschmerz*.

The scientific study of religion is a product of modern Western academia, while the *Bhagavadgītā* is an ancient and popular text of the oriental religion of Hinduism. What contribution could one expect from the former toward deepening our understanding of the latter? Unlikely as it may appear, this is precisely my claim—that the modern scientific study of religion in this case actually enhances our religious understanding of that Hindu text.

In order to justify this claim I begin with Eugene G. d'Aquili's nine primary sensory states to which human experience of the world can be reduced "without involving internal contradiction" (d'Aquili 1982, 362).

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Three parameters are involved in determining these nine states: (1) whether perceptions are unitary or multiple, (2) whether relationships are regular or irregular, and (3) whether the affective valences are positive, negative, or neutral. The use of these parameters to construct a system yields the following nine primary sensory states (d'Aquili, 1982, 362):

1. multiple discrete reality — regular relationships — neutral affect
2. multiple discrete reality — regular relationships — positive affect
3. multiple discrete reality — regular relationships — negative affect
4. multiple discrete reality — irregular relationships — neutral affect
5. multiple discrete reality — irregular relationships — positive affect
6. multiple discrete reality — irregular relationships — negative affect
7. unitary being — neutral affect
8. unitary being — positive affect
9. unitary being — negative affect

Although all nine states thus generated are of considerable interest, we restrict our consideration here to the first three, which pertain to the waking state, characterized by multiple discrete reality and regular relationships. This corresponds to the setting of the *Bhagavadgītā*, which unfolds in the form of a dialogue between Krishna and Arjuna in a chariot on the battlefield—a setting characterized by multiple discrete reality and regular relationships.

The three primary states—all of them characterized by multiple discrete reality and regular relationships—are distinguished by their affective valences. These distinctions are crucial to them and crucial for our understanding of these states in relation to the *Bhagavadgītā*. It is important therefore to share their description as offered by d'Aquili.

The *first primary sensory state* is characterized by multiple discrete reality and regular relationships and possesses a neutral valence. It is described by d'Aquili in the following terms:

> The first of these states involves the perception of discrete entities that are related to each other in regular ways, for example, in predictable ways. The affective valence in this world perception is neutral. I will refer to this state as the "baseline" state. It is the primary knowing state that most people are in most of the time. I presume it is the state that most readers are in at this moment; for example, most of us are quite certain of the reality of the furniture and people surrounding us. I am sure that very few if any of us would question the fundamental reality of the state we are in. It is precisely because this state appears certain while one is in it that it is a primary sense of reality. Furthermore, most people would consider this state as the only reality or the only valid epistemic state. However, the fact of the matter is that not only is this sense of reality not unique but there are two other stable perceptions of discrete reality which are also primary. These other two states resemble the state most of us are in most of the time in that the regularities of time, space, and causality are the same and in that there is the perception of the same discrete entities. Where they differ is in the affective valence, positive or negative, of the perception of the world. (d'Aquili 1982, 362–63)

This is the state in which we find Arjuna at the beginning of the *Bhagavadgītā*.

The *second primary sensory state* too is characterized by multiple discrete reality and regular relationships but possesses a positive affect. According to d'Aquili,

> The second primary sense of reality involves the same discrete entities and regularities as the baseline ordinary state of most people's perception, but it involves as well an elated sense of well being and joy, in which the universe is perceived to be fundamentally good and all its parts are sensed to be related in a unified whole. There is often in this state a sense of purposefulness to the universe and to man's place in the universe. This sense of purposefulness may defy logic and certainly does not arise from logic; nonetheless it is a primary stable perception. The onset of such an exhilarating view of reality is usually sudden and has been described as a conversion experience by a number of people. It has been described over and over again in the religious literature of the world. (d'Aquili 1982, 363)

In the *Bhagavadgītā*, Arjuna undergoes a kind of conversion experience in Chapter XI.

The *third primary sensory state* also is characterized by multiple discrete reality and regular relationships but possesses a negative affect. Its character is less than self-evident, and it has central importance for the development of the theme of this article. D'Aquili describes it thus:

> We now come to the third primary sense of reality which is also a very stable one. This sense of reality is like the first two in that it deals with the world of multiple discrete beings and has the same high degree of regularity of causal, spatial, and temporal relationships. It differs from the first two in that the basic affective valence toward the perceived universe is *profoundly negative*. This has been dubbed *Weltschmerz* in the psychiatric literature and consists of a sense of exquisite sadness and futility, as well as the sense of the incredible smallness of man in the universe, the inevitable existential pain of the world, and the suffering inherent in the human condition. Often there is the perception of the whole universe as one vast pointless machine without purpose or meaning; a mild form of this often occurs with high school or college students and other young adults. In its full-blown form, however, it is similar to the cosmic consciousness or illumination described above in that it occurs with a suddenness that leaves the individual totally perplexed. Since 1969 I have treated twelve individuals, who came to me with this as a problem in the full-blown form, and all but two experienced it with sudden onset. Usually the individual wakes up with a profound sense of loss and meaninglessness to the world which never leaves. It is the basic sense of reality which appears to underlie much existentialist thought, particularly in French existentialist literature. It is the sort of perception in which the universe is apprehended not in any way as neutral but as essentially absurd, and often suicide is thought to be the only truly human response. (1982, 364; emphasis added)

It is significant that Arjuna in the *Bhagavadgītā* virtually contemplates suicide (I.46). It is equally significant that such a state overcomes Arjuna *all of a sudden* on the eve of the battle, as described in the first chapter of the *Bhagavadgītā*.

A brief word now about the *Bhagavadgītā*, before the analysis of the three primary epistemic states is applied to it for the light they might shed on the text.

The *Bhagavadgītā* is in the form of a dialogue between Krishna and Arjuna and consists of eighteen chapters. The first chapter discloses Arjuna, the warrior-hero, on the field of battle. Before the chapter is over, however, he develops a case of nerves. Its description has become classic and runs as follows in an English translation (Zaehner 1969, 46–47):

> "Krishna, when I see these mine own folk standing [before me], spoiling for the fight, (29) my limbs give way, my mouth dries up, trembling seizes upon my body, and my [body's] hairs stand up in dread. (30) [My bow,] Gāṇḍīva, slips from my hand, my very skin is all ablaze; I cannot stand and my mind seems to wander. (31) Krishna, adverse omens too I see, nor can I discern aught good in striking down in battle mine own folk. (32) Krishna, I do not long for victory nor for the kingdom nor yet for things of pleasure. What should I do with a kingdom? What with enjoyments or [even] with life? (33) Those for whose sake we covet kingdom, enjoyments, things of pleasure, stand [here arrayed] for battle, surrendering life and wealth—(34) teachers, fathers, sons, and grandsires too; uncles, fathers-in-law, grandsons, brothers-in-law—kinsmen all. (35) Krishna, though they should slay [me], yet would not I slay them, not for the dominion over the three worlds, how much less for the earth [alone]! (36) Should we slaughter Dhritarāshtra's sons, Krishna, what sweetness then is ours? Evil, only evil, would come to dwell with us, should we slay them, hate us as they may. (37) Therefore we have no right to kill the sons of Dhritarāshtra and their kin. For, Krishna, were we to lay low our own folk, how could we be happy? (38) And even if, bereft of sense by greed, they cannot see that to ruin a family is wickedness and to break one's word a crime, (39) how should we not be wise enough to shun this evil thing, for we clearly see that to ruin a family is wickedness. (40) Once the family is ruined, the primeval family laws collapse. Once law is destroyed, then lawlessness overwhelms all [that is known as] family. (41) With lawlessness triumphant, Krishna, the family's women are debauched; once the women are debauched, there will be a mixing of caste. (42) The mixing of caste leads to hell—[the hell prepared] for those who wreck the family and for the family [so wrecked]. So too their ancestors fall down [to hell], cheated of their offerings of food and drink. (43) These evil ways of men who wreck the family, [those evil ways] that cause the mixing of caste, [these evil ways] bring caste-law to naught and the eternal family laws. (44) A sure abode in hell there is for men who bring to naught the family laws: so, Krishna, have we heard. (45) Ah! Ah! So are we [really] bent on committing a monstrous evil deed? Intent as we are on slaughtering our own folk because we lust for the sweets of sovereignty. (46) O let the sons of Dhritarāshtra, arms in hand, slay me in battle though I, unarmed myself, will offer no defence; therein were greater happiness for me."
>
> (47) So saying Arjuna sat down upon the chariot-seat [though] battle [had begun], let slip his bow and arrows, his mind distraught with grief.

Arjuna's charioteer, Krishna, who is regarded within the Hindu tradition as God incarnate, tries to talk Arjuna out of his state of "funk." Ten chapters go by, but Arjuna is unmoved. Then in the eleventh chapter Krishna reveals himself as God. Arjuna is overcome with emotion. Zaehner summarizes the chapter as follows:

THIS chapter is the climax of the Gītā. In it Krishna reveals Himself in all his terrifying majesty.

Arjuna, not content with the account of Krishna's "far-flung powers" of which he had heard in the last chapter, asks to *see* his "Self which does not pass away" (I–4).

Krishna grants his request and gives him a "celestial eye" with which he may behold his transfiguration (5–8). The rest of the chapter is an account of the tremendous vision in which the universe in all its variety is seen as Krishna's body—all its multiplicity converging onto One (9–13). Arjuna then describes what he sees: the entire world is rushing headlong into Krishna's mouths (15–31).

Krishna then explains that He is all-consuming Time and that as such He has already killed the Kaurava hosts: Arjuna is to be but the occasion (32–46). The vision over, Krishna resumes his human form, and ends up by telling Arjuna once again to worship Him with love that he may enter into Him (47–55). (Zaehner 1969, 303)

Remarkably, even after God's self-disclosure Arjuna is not ready to take up the struggle.[1] This has struck many as odd, and some have even suggested that the original text perhaps ended here or soon after and that chapters 12–18, which also seem less inspired, are later additions.

Finally, at the end of the eighteenth chapter, Arjuna indicates his willingness to join the struggle (XVIII.73), and the *Bhagavadgītā* soon ends.

It seems to me that d'Aquili's analysis of the three primary sensory states with their different valences not only enhances our understanding of the *Bhagavadgītā* but also helps solve a riddle of the *Bhagavadgītā*. Arjuna is in the third primary state—that of *Weltschmerz*—by the time the first chapter ends. He does not want to fight. His feelings are profoundly negative. Things remain more or less that way, although with diminished intensity, until the eleventh chapter, when the theophany catapults him dramatically into the second primary sensory state, characterized by a "cosmic consciousness" generated by the revelation.

However, Arjuna is still not ready to fight. Earlier, he was depressed to the point of panicking; now he can't fight because he is elated to the point of being terrified! He wants God to return to his normal state and himself too. This explains why the *Bhagavadgītā* does not end here—because Arjuna can only resume fighting in the *first* primary sensory state, what d'Aquili calls the baseline state. He takes some time, and an additional six chapters, to reach it.

Thus, d'Aquili's first three primary sensory states are extremely helpful in analyzing the religious psychology of Arjuna and thereby shed a flood of light on the *Bhagavadgītā*. In this case at least, the scientific study of religion has deepened our appreciation of the *Bhagavadgītā*.

NOTE

1. Scholars have had to explain this fact, or explain it away. One example is as follows:

Zaehner calls the opening verses of the twelfth chapter "one of the biggest anti-climaxes in literature." Though it follows smoothly from Krishna's discussion in chapter eleven, its dispassionate tone seems to show no reaction to the vision of that chapter. Numerous suggestions have been made for the fact that chapter eleven is not the final chapter of the *Gītā*. Zaehner says that chapter twelve follows so closely on 10.10 that one is tempted to rearrange the text. Those who believe that the highest reality is the impersonal Absolute and not the clearly personal divinity of the vision see the following chapter as teaching that which is beyond and above that vision. Thus, Radhakrishnan says (on 11.55), "The Gita does not end after the tremendous experience of the celestial vision. The great secret of the Transcendental Atman, the source of all that is and yet itself unmoved forever is seen. . . . The search for abiding reality, the quest of final truth cannot end, in emotional satisfaction of fitful experience." Yet the *Gītā* does in fact seek a higher experience or a higher reality. The remaining chapters elaborate upon what was seen but do not go beyond it experientially.

Deutsch suggests as a solution that after the vision Arjuna needs to learn again about the nature of the ordinary, everyday world. Otherwise it is likely that Arjuna might forget the world completely after such a great vision, or even become proud for having experienced it. Thus, further teaching is needed to bring Arjuna down to earth. As Maitra puts it, this represents the descent of the soul to the human plane after it has realized its cosmic purpose. The final chapters, he notes, are devoted to "the discussion of the proper subjective attitude in view of the immeasurable gulf that separates the individual from God." (Minor 1991, 361)

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Reviews

Unprecedented Choices: Religious Ethics at the Frontiers of Genetic Science. By Audrey R. Chapman. Minneapolis: Fortress Press, 1999. ix + 261 pages. $22.00 (paper).

This book is a very welcome addition to the already distinguished series Theology and the Sciences. Audrey Chapman provides a well-informed critical discussion of both the implications of recent genetic science for religious ethics and the contribution that religious ethics have made, or might still make, for society at large as it attempts to evaluate the ethical and social implications of this science. As director of the Program of Dialogue on Science, Ethics and Religion at the American Association for the Advancement of Science (AAAS) at Washington, D.C., she is an ideal person to write this book. A decade of active engagement with religious leaders, theologians, and scientists on genetic issues, attempting to establish well-informed and credible responses, gives her the edge over many others. It also has left her less than sanguine about the overall contribution of religious ethicists to the crucial issues increasingly raised by genetic science.

Three substantial chapters survey, in turn, the contributions of religious ethicists, to (1) the possibility of human genetic engineering, (2) the possibility of human cloning, and (3) the ongoing debate about the patenting of life. Those who have been engaged actively in the current debate will be very familiar with the issues and arguments used, and Chapman adds little that is new in the first two of these areas. Nonetheless, what she does write is clear, accurate, and perceptive. Because she adopts a survey style rather than a thematic approach in these chapters, there is a considerable amount of repetition of points, arguments, and even quotations. She also does not seem particularly aware of parallel British and European discussions. As in the United States, a number of British religious ethicists have been discussing genetic issues over the last decade, and most British government or Foundation reports on genetics and ethics have included religious ethicists in their panels. An adequate survey should include more of these non-American contributions, although I am not sure that it would finally add much to the actual substance of the debate. There are as yet only so many points to be made about the merits or otherwise of novel but circumscribed areas such as genetic engineering or reproductive cloning.

It is in the third area—on the patenting of life—that Chapman makes a distinctly more original contribution. She takes as her starting point the Joint Appeal against Human and Animal Patenting made in May 1995 by more than eighty religious leaders. The Appeal opposed the patenting of human and animal life forms on the grounds that "humans and animals are creations of God, not

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humans, and as such should not be patented as human inventions." Instructively, this is the area that has most actively concerned her work for the AAAS. Because of the legal complications in this area debate about it has been particularly convoluted both in the United States and in Europe. Chapman offers a useful guide through this legal minefield and a clarification of the specifically ethical issues identified in the secular debate before turning at some length to the theological issues involved. At this point she offers an important critique of what she sees as the simplicities of the Joint Appeal. She argues that it has been a long-standing tendency of religious leaders in such debates to offer rhetoric rather than properly informed argument. For example, as it stands, she believes that the Joint Appeal depends upon a static, pre-evolutionary understanding of creation in which life forms are firmly fixed by God. It also has an unnuanced understanding of "ownership" that takes no account of the concept of humans as "created co-creators" developed by theologians Philip Hefner and Ted Peters. She is skeptical about the legitimacy of religious leaders speaking on behalf of their faith traditions without extensive prior consultation of a strong cross-section of their members.

However, Chapman still believes in public theology and in religious ethicists seeking to influence society at large, especially on ethical issues. The two chapters that follow offer an extensive discussion, first, of how theologians should take more account of scientific developments, and then of how they should seek to engage in public theology. At the first of these levels she believes that most theologians have still to assimilate the implications of Darwin and modern genetics properly into their understanding of creation, human distinctiveness, sin, and the soul. She examines the claims of sociobiology and, like Stephen Pope, is sympathetic to a judicious assimilation even here (although she is rightly critical of some of the more exaggerated claims of Richard Dawkins and Edward O. Wilson). At the second level she argues repeatedly that public theology in the area of genetic science should succumb neither to the abandonment of theistic language (she is particularly critical of James Childress on this account in his highly influential medical ethics) nor to simplistic biblical or theological claims.

This last point is crucial to all of us who work as religious ethicists alongside physical and social scientists and will be of special interest to readers of *Zygon*. What is the responsible way to do religious ethics on scientific issues within pluralistic, modern societies? Chapman is well aware that some secular scientists would exclude religious ethicists from any discussion that impinges on their work. She counters this with the position taken by the National Bioethics Advisory Commission, that the claims of religious traditions should be taken seriously, without being regarded as determinative, because historically and currently they mold the moral views of many citizens. Once it is acknowledged that secularists themselves do not arrive at moral positions independently of culture, there is a strong ground for not excluding any significant section of a particular culture. So far, so good.

The next stage of Chapman's position is more problematic. Her book is strongest when exposing the inadequacies of various religious positions, either because they fail to properly understand genetic science or because they make tendentious connections between theology and particular claims or prescriptions relating to genetic science. Such religious responses thus fail at either the cognitive or the hermeneutical level. Yet her own connections are quite tentative and are seldom

distinctively theological. She argues that religious ethicists tend to differ from secular ethicists in a number of important ways: they are more likely to move beyond individual autonomy and consent and to emphasize wider interpersonal and social relationships; they are more committed to justice and concern for the vulnerable; and they belong to religious communities with uniquely long traditions of moral discussion and attention to moral behavior.

I agree strongly with all three distinctive virtues and see them as crucial to my own work with secular bodies, in my case as a member of the British Medical Association's Medical Ethics Committee. All of these, however, are derivative virtues rather than the explicitly doctrinal claims usually advanced by exponents of public theology. Chapman claims briefly that there is a greater tolerance in secular society today for theistic arguments (but, tellingly, she does not make the same claim for christological arguments). Perhaps this is true in the United States—although I doubt if it is true in the U.S. secular academy—but I fear that it is not true in Britain or more widely in much of Europe, where memories of religious wars and/or religious hegemonies are still too recent for this to be possible. Given the latter, the religious ethicist engaged in the genetics debate within the public forum may simply have to choose to either (1) use explicitly religious arguments and, in the process, inform their religious communities but be ignored by society at large, or (2) represent the virtues of social concern and justice derived from their communities while largely eschewing public discussion of theological metaethics. If Stanley Hauerwas represents the first position in the United States, James Childress represents the second. Within Britain, Oliver O'Donovan and I represent a similar polarity. Those from the first position often regard those from the second as faithless, whereas those from the second tend to regard those from the first as sectarian. Neither label withstands much scrutiny, if left unqualified, because these differing positions are primarily public strategies rather than ontologies. Still, they remain difficult to resolve and continue to have a profound effect on religious ethics at the frontiers of genetic research.

Chapman has more work to do if she is to be convincing that there is a viable middle option. She has, nevertheless, written an important and helpful book on an area of prime ethical interest today.

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The Mind of the Universe: Understanding Science and Religion. By Mariano Artigas. Philadelphia: The Templeton Foundation Press, 2000. xx + 364 pages. $22.95.

Mariano Artigas, a Roman Catholic priest and professor of natural science at the University of Navarra in Pamplona, Spain, addresses some of the difficult yet germane concerns pertaining to the science-and-religion dialogue. Artigas, in his easily accessible eight chapters, reflects on chaos theory, self-organization in biological evolution, thermodynamics, teleology, the rationality and ethics of science, and the writings of scholars from Sir Karl Popper to Paul Feyerabend. After subsequent analysis of the ideas proposed by many experimental theories or philosophies, Artigas concludes by revealing how to bridge the methodological gap between science and religion in order to provide the basis for a rational search for philosophical meaning of new scientific theories.

Artigas begins by discussing the presuppositions that underlie and support empirical science. His systematic examination of scientific assumptions should be recognized as a monumental success; nowhere in the literature does any other scholar explore this matter with such breadth and meticulous attention. He articulates that scientists possess three foundational presuppositions in order to perform experimental research: belief in the existence and intelligibility of natural order, faith in human ability to uncover truths about nature, and the existence of values in scientific explorations and decision making. The acknowledgment that science contains philosophical presuppositions that are necessary for the establishment of experimentation is a critical point of the book that opposes the idea, advocated by many empiricists, that philosophy is irrelevant to science. Scientific progress reveals that these presuppositions exist and validates the power of the scientific approach, which is mistakenly rejected by thinkers skeptical of scientific methods. In his introduction Artigas explains:

> Scientific progress provides feedback on these presuppositions, because it retrojustifies, enriches and refines them. Just as these presuppositions are necessary conditions for the existence of science, scientific progress is sufficient evidence of their existence and enables us to determine their scope.
>
> Seen in the light of that feedback, the analysis of these presuppositions can provide a clue to the philosophical meaning of scientific progress and, therefore, to its theological relevance. (p. xix)

Artigas acknowledges the methodological gap between science and theology during his analysis of boundary questions, which are currently perceived as the potential bridges between science and religion. Nevertheless, he explores the presuppositions of science throughout the work to bridge the two disciplines, because he thinks that the presuppositions themselves, as well as the insights they provide, will yield the most fruitful material for true discussion. It is clear that neither science nor theology can explain everything, and Artigas's articulation of scientific assumptions and his strategy for epistemological research is a breakthrough in the science-and-religion dialogue. Essentially, as Artigas himself explains, "to bridge [the gap between science and religion] we will need to use intellectual tools, which must include elements common to the opposite sides of the bridge" (p. 12). Philosophy, then, acts as the mediator between science and

religion, for neither alone can answer questions that lie outside their respective domains.

The very fact that science harbors metascientific assumptions leads Artigas to introduce two realizations germane to the fertility of the science-and-religion dialogue. The first is the recognition that metascientific foundationalism must have arisen in history somehow. The second is that progress in science must reveal something about the rationalistic and spiritualistic dimension of human nature.

Following the lead of Stanley Jaki, Artigas respects the view that Christianity throughout history has provided a cultural matrix whereby scientific presuppositions would have been introduced. For example, faith in an intelligible natural order was a Christian premise vital for the birth of empirical exploration. Such an illumination makes tangible the possibility of a fruitful and justified dialogue between science and religion. No longer is its dismissal as an artifact of modern cultural influence and propaganda vindicable. A logical parameter exists for promoting the dialogue, and it foreshadows the ultimate success of the dialogue.

In part 2 of the book, Artigas analyzes the various theories postulated for a comprehensive worldview and introduces information for a new and more unified picture of the world that has scientific support from work on thermodynamics of irreversible processes, catastrophe theory, synergetics, deterministic chaos, and theoretical research on biological self-organization and evolutionary emergence. This new scientific worldview confirms the values of Christian ideas of a natural order and the human ability to understand that order and even amplifies them. In addition, Artigas sees the *rationality* of science as a component of the overall rationality of human beings. He concludes,

> . . . the feedback of scientific progress on the epistemological presuppositions of science demonstrates that we transcend nature even though we are a part of it. Scientific creativity is a proof of our singularity. It shows that we possess dimensions that transcend the natural level and can be labeled as spiritual. The very existence and progress of the natural sciences are two of the best arguments for our spiritual character. (p. 246)

The acknowledgment of human spirituality unavoidably leads one to question the source of such spirituality. In light of this, Artigas advocates that scientific progress ultimately reconfirms his view that God exists and that "man is a cocreator who participates in God's plans" (p. 247).

Recognition of human spirituality and its relation to the divine from philosophic reflection of scientific progress also leads one to consider the ethical, value-laden component to the scientific enterprise. Essentially, apart from ontological and epistemological presuppositions, there also exist *ethical* presuppositions of science that are needed for its continuation. In part 4, Artigas presents a comprehensive analysis of the various kinds of values embedded in the scientific enterprise. *Constitutive* values encompass the general, unchangeable goals of science, such as the search for truth and controlled dominion over nature. *Institutional* values refer to the social aspect of science—values that are derived from the "communal" character of the scientific enterprise, such as cooperativeness, intellectual humility, and open-mindedness in scientific research. Like ontological and epistemological presuppositions, the ethical presuppositions of science are retrojustified by scientific progress. Consequently, Artigas explains, "our mastery over nature should not be tyrannical" (p. 248) but rather directed toward opening up new

vistas of exploration and promotion of civilization that can lead to veneration of nature, reverence for its creator, and respect toward ourselves.

Artigas ends his work by affirming a scientific realism about the world that can harmonize with religious belief. He explains that science is committed to discovering partial or "contextual" truths about nature, which are validated by the predictive, fertile, and explanatory power of science. Such a commitment of science to discover truth parallels the commitment of religion to discover truth.

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The Philosophy of Nature of St. Thomas Aquinas: Nature, the Universe, Man. By Leo Elders. Frankfurt am Main and New York: Peter Lang, 1997. 387 pages. $57.95 (paper).

Leo Elders provides a sweeping and detailed examination of Aquinas's philosophy of nature. The book is divided into two main sections. The first explicates Aquinas's "General Philosophy of Nature," including his view of substance, motion, change, and time. The second, more lengthy, section examines his "Particular Philosophy of Nature," including local movement, the structure and duration of the universe, the nature of change, organic life, sense knowledge, human nature, the soul, the intellect, the will, temporality, and the place of humanity within nature. Elders is aware of the importance of cosmology, but his major concern is with human nature, or philosophical anthropology. He devotes the bulk of his attention to this topic in order to make available what he takes to be Aquinas's major and perennial insights.

Elders summarizes the anthropology of Aquinas in six themes: the body-soul unity of the person, the immateriality of the soul, the soul as the form of the body, the infinite capacity of the human mind, the person as the image of God, and the person as *homo viator*, a being on the way to a transcendent goal. Elders's monograph provides a very helpful, detailed explication of Aquinas's understanding of and arguments for these central anthropological themes, as well as a helpful contextualization of their place within Greek, medieval, and modern philosophies of nature. The author is clearly steeped in Thomistic scholarship and provides reliable guidance in this complex body of literature.

Elders writes not only descriptively, as an intellectual historian, but also normatively, as an advocate of Aquinas's philosophy: he believes that Aquinas's philosophical account of human nature continues to be the only adequate philosophical perspective. He tends to write as an originalist who believes that Aquinas stands well enough on his own, even for us today, rather than as a reconstructivist who believes (as did, for example, Karl Rahner and Bernard Lonergan) that major renovations must be made to make Aquinas intelligible for and relevant to our day. "More than seven centuries separate us from St. Thomas, but human nature remains the same, as long as there will be men," writes Elders; "the answers elaborated by Thomas Aquinas as to man's nature, his mind and free will, the origin

and destiny of the soul, retain their truth and value" (p. 373). Thus, the book also carries a somewhat polemical tone against what its author takes to be major contemporary competitors of Thomistic anthropology—Bergsonianism, Marxism, and existentialism.

This having been said, Elders understands that modern science has thrown light on human nature in ways unanticipated by Aquinas. Elders believes that all that is true in contemporary science is compatible with the authentic philosophical anthropology of Aquinas. Aquinas, he believes, offers the proper philosophical framework and foundation within which one can properly appropriate the insights of the various sciences. Hence, Elders proposes that contemporary science can correct the empirical mistakes Aquinas inevitably absorbed from the available culture of his day, while Thomism can correct and provide a more sound alternative to the philosophical distortions to which contemporary scientists are often (and unsuspectingly) prone.

This book offers a quite helpful introduction to the central themes in Aquinas's philosophy of nature. Yet, when Elders introduces issues from contemporary science, he merely suggests connections rather than establishes their relation in a detailed and theoretically satisfying argument. For example, he asserts that the "anthropic principle" is already resident in Aquinas's cosmology (p. 134) but neither explains what he means by this nor defends this assertion against obvious anticipated counter-arguments.

Neither does he engage in depth any alternative construals of nature that hold a major place in current philosophical circles. Karl Popper, Thomas Kuhn, Imre Lakatos, and Nancey Murphy do not even appear in the index. One will also be disappointed if looking for a detailed discussion of the philosophical implications of evolutionary theory for Thomistic anthropology; indeed, Elders's own understanding of evolution and Darwinism leaves a lot to be desired (see, for example, pp. 349ff.). To mention just one problem, he asserts without argument that if species evolve, the evolutionary process must be guided by an "outside cause" (p. 360) of the sort that is attacked thoroughly by Dawkins and others but is neither defended nor even explained by Elders. In general, the book conveys a sense of self-confidence cultivated in intellectual isolation. Elders is content to rehearse the Thomistic arguments for the immateriality of cognition without engaging contemporary scientifically informed philosophers of mind such as Daniel Dennett or Owen Flanagan who argue vigorously against this immateriality. The same is true of his claims that thought is prior to language (pp. 227–28), that natural desire cannot be in vain (p. 284f.), and that everything in the material universe is directed to the human soul (p. 336).

In my opinion, this book is read profitably as an exercise in the history of ideas. The author knows Aquinas. He is a widely respected scholar who provides here a basic resource for historical study. Those seeking a more constructive engagement with contemporary debates connecting Thomistic philosophy of nature with current philosophical and scientific theories of nature should look elsewhere.

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The Far-Future Universe: Eschatology from a Cosmic Perspective. Edited by George F. R. Ellis. Published in association with the Pontifical Academy of Sciences and the Vatican Observatory. Philadelphia and London: Templeton Foundation Press, 2002. ix +384 pages. $39.95.

Many answers have been given to the question of the ultimate end of the universe. Will it end with a slow heat death as its entropy approaches its maximum value, or will it end in a mighty explosion? As our sun reaches the end of its life, will it be possible for the human species to survive by traveling to a planet orbiting a distant star? These questions refer to the far distant future and so are hardly a matter of urgency, but it is interesting to see what contemporary scientific research says about them.

The editor of this collection of essays, George F. R. Ellis, is a well-known astronomer, and he brought together a very distinguished group of cosmologists and theologians to consider this question at a conference held in the villa occupied by the Pontifical Academy of Sciences in Vatican City.

After an introduction by Ellis, George Coyne, S.J., considers the theological perspective. He emphasizes that, in spite of all we already know about the evolution of the universe, we must recognize the limitations of our scientific knowledge when we speculate about the far distant future and recognize that it is also a theological question relating to the actions of God the Creator. As such, it is much more than a scientific problem; it concerns our personal relationship to God, who brought the universe into being and controls the destiny of each of us.

Four scientists—John Barrow, Paul Davies, Michael Heller, S.J., and Martin Rees—then address the problem from the cosmological point of view. Barrow outlines some of the physical possibilities, emphasizing the importance of the quantum vacuum. Davies describes six cosmological models, together with what they imply for the ultimate fate of the universe. Heller considers the concept of time in recent cosmological studies. Rees asks whether there are intelligent aliens to share our future. Is the universe made especially for us by an all-powerful Creator? Are there many universes, governed by different laws?

The next section considers the problem from a biological perspective. Graham Cairns-Smith, who has studied early evolution, examines exotic genetic materials and points out that the concept of life may be much wider than what we know now. Two seminal papers by theoretical physicist Freeman Dyson on "Physics and Biology in an Open Universe" and on whether life is digital or analog give a mathematically sophisticated account of possible ways the universe could end. He considers three questions about the end of the universe and concludes that it is unlikely to end as a permanent freeze, that it is possible for life to survive indefinitely, and that it may be possible to send information from one galaxy to another, even though the people on them are participating in the cosmic expansion. Dyson thinks that it is possible for life to evolve into transhuman existence in an analog or digital computer. He concludes that analog life could survive indefinitely on a finite amount of energy, although that would involve progressive reduction in the quality of life.

In the final essay of the biological section, Simon Conway Morris asks whether biology can have an eschatology, and, if so, whether this has cosmological implications. He concludes that "biology and evolution possess an inherent structure

that is not only consistent with the plenitude of the biosphere but more controversially is so arranged as to preordain the emergence of one (or more) sentient species." This argument is similar to the anthropic principle in cosmology and fits naturally within an eschatological perspective.

The next section contains four essays under the heading of Humanity. Stephen Clark begins with a study of deep time, by which he means "the ethical and metaphysical effect of placing ourselves in the context of bygone and future ages." There are various possibilities for the future; it may be catastrophic and short, or long and triumphant. A related theme is taken up by Steven Brams and Marc Kilgour, who write on "games that end with a bang or a whimper" and consider the various strategies that can be adopted by contestants in games and their application to warfare. They make a vital distinction between bounded and unbounded games, emphasizing that the latter "encourage co-operative play, foster hope and lead to more auspicious outcomes." The vital question of artificial intelligence and the far future is then discussed by Margaret Boden. She asks whether it will support and enrich or undermine our ideas about humanity. Intelligence may migrate to machines, but maybe intelligent life cannot. Finally, in a chapter on cosmic eschatology versus human eschatology Owen Gingerich assesses the future of humanity on human and cosmic time scales. He questions traditional views of eternity and puts forward the concept of a timeless eternity. The Christian who faces the problem of the purpose of it all can perhaps find the best response in trust.

The last section is devoted to theology. It begins with an essay by Keith Ward on cosmology and religious ideas about the end of the world. He surveys the beliefs of Eastern religions and those of Judaism, Islam, and Christianity. Some Eastern religions such as Hinduism and Buddhism adhere to a cyclical view of time, whereas others like Taoism and Confucianism are not much concerned about the end of the world. Judaism and Islam, together with Christianity, have a vision of hope for the future. Modern knowledge of the universe adds depth to this vision. Jürgen Moltmann in "Cosmos and Theosis: Eschatological Perspectives on the Future of the Universe" points out the contrasts between the ideas of a beginning and an end and emphasizes the central importance of the resurrection of Christ. He looks forward to a transformation of the world, when everything is made new. In his contribution, "Eschatology and Physical Cosmology," Robert Russell contrasts theological views with scientific and humanistic views and asks how they may be reconciled. Finally, editor Ellis observes that discussion of what happens in the far future depends on one's ontology, or what is considered as truly existing. Some forms of existence are intrinsically eternal, while others change and die away. This unites ontology and causality from the scientific point of view and its extension to morality and theology. An essay of Olaf Stapleton, reprinted as an appendix, raises many of these issues in fictional form.

These brief summaries only hint at the richness of the discussion and the wide range of subjects covered. It would be difficult to think of a more distinguished and qualified group of scientists and theologians who can say what we know and what we can speculate about so vast and mysterious a theme.

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Rethinking Theology and Science: Six Models for the Current Dialogue. Edited by Niels Henrik Gregersen and J. Wentzel van Huyssteen. Grand Rapids: William B. Eerdmans, 1998. viii + 240 pages. $25.00 (paper).

Attempting to move beyond first-generation thinkers Ian Barbour, Arthur Peacocke, and John Polkinghorne, six philosophically trained professors in theological academic positions analyze the current dialogue between science and theology. Cognitive disunity in both science and theology shown by postmodern criticism forms the background of the conversation. The unstated thesis of all the essayists is that novel philosophical analysis, especially of the issue of realism, becomes the most effective means of enabling the discussion.

I find little new in their presentation that has not been more acutely presented by the three major philosophers of the last century, Edmund Husserl (phenomenology), Ludwig Wittgenstein (language analysis), and Alfred North Whitehead (process thought).

Although the six authors refer to and build upon Nicholas Rescher and other contemporary philosophers, they do not consider obvious applicable objections from phenomenology, language analysis, or process thought, even when they are championing one of these positions. For example, Eberhard Herrmann, who tries to engage the problem of pluralism, gives a language-analysis approach based on statements but fails to show any criticism of his position from phenomenological thought or the process logic of Whiteheadian propositions. One would think that since unity, or lack thereof, in both science and religion is so important, consideration would be given to phenomenological studies of science and religion that establish unity of subject matter without assuming substantive existence external to human minds. Because all of the authors affirm some variety of ontological realism, I find particularly egregious the complete neglect of Whitehead, the one avowed realist among the three major philosophers.

The six articles are substantive, philosophically sophisticated, and helpful to the current debate if one accepts a position stated by Kees van Kooten Niekerk: "the human mind . . . has no direct access to the external world" (p. 68). Herrmann puts it, "We cannot directly compare statements about the world with reality itself" (p. 138). I find comparable assertions in the other authors. They all assume that we know best our own mental existence (abstractions) from which we must infer reality itself.

Whitehead turns this mentalist assumption on its head by affirming that all entities, including rational human agents, synthesize what they are in terms of a selection from direct but partial access to their past external world. Within a process perspective the traditional question of realism, whether one can argue from abstractions to existence, is no longer an issue. We know external existence because, using Whiteheadian language, we prehend it. The question becomes how and to what degree the abstractions we create out of such prehensions describe the known and felt real world.

The authors of this book take more seriously the process orientation of their acknowledged mentors, Barbour and Rescher, who both affirm the priority of events over substance. In my judgment, the realism of Whitehead has advantages over that of Rescher. For Whitehead the discreteness of events is defined by the events themselves, for Rescher by observers. This means, from a Whiteheadian

perspective, that subjects like electrons, human soul events, and God exist in radical independence of human consciousness. Yet, an explanation of pluralism and why cognitive unity in science and religion is so difficult to obtain follows naturally from Whiteheadian realism.

J. Wentzel van Huyssteen in "Postfoundationalism in Theology and Science: Beyond Conflict and Consonance" forcefully reminds us that the rationality of both theology and science is to be found only in their developing traditions. He proposes a model of rationality in which the rational agent is taken as primary, rationality is determined by social conditions not rules, hence expertise within the community defines the quality of reason. Process thought points to a plurality of objects as well as scientific or religious positions—for example, physical rocks and the scientific paradigms of Thomas Kuhn. The molecules of rocks and the rational personal events of scientists absorb the structure of their being and understanding from their limited direct experience of their relevant historical past. The past causal molecular rock-events and scientist-mental-events so enable and constrain both the societal rock and scientific culture that rocks continue to be rocks and scientists continue to work within the normal science of the paradigm.

In "A Critical Realist Perspective on the Dialogue between Theology and Science," Niekerk emphasizes the importance of critical realism for the science-religion debate. He asserts that science and religion deal with entities independent of our experience, science more with objects to which probabilistic mathematics may apply and religion with subjects, particularly God, involving intention and emotion. Since both kinds of entities are subject to the limitations of the activities of knowing, Niekerk also recommends community-based communication between science and religion following appropriate canons of rational discourse. Process thought can be used to develop the major concerns of Niekerk—with a far more vigorous realism.

Willem B. Drees in "The Significance of Scientific Images: A Naturalist Stance" affirms a "hard" naturalism. Nature is "the whole of reality" in which nothing supernatural or spiritual shows up. It is a unity composed of all the same small ontological physical constituents. Apparent transcendence within nature, for example the transcendence of human existence over that of cellular or atomic existence, is explained by the complexity of the microscopic ontological real constituents of the universe. Of course, Drees as a rational agent can define nature, but his definition has authority only if he is something more than the collection of his subatomic parts. Why not accept a process position that allows ontological transcendence of the human rational soul within nature and then show process compatibility with contemporary science? There are many process physicists, biologists, psychologists, and others who have done exactly that. God can then be a subject of direct consideration rather than being pushed to the evaporative limits at the edge of cosmology, as Drees suggests.

Herrmann, in "A Pragmatic Approach to Religion and Science," a language-analysis approach, provides an epistemological analysis of statements in order to affirm many views of life that develop because of a human desire to cope with contingencies. Hermann assumes that God as well as physical things are inferred by language and, hence, from a mentalist assumption, do not necessarily function as existents in the real world. Yet Hermann wants a limited realism. To me it is easier and more satisfying to affirm a realism that acknowledges subjects in both

science and religion that have similarities and then show how abstractions affect and limit our knowledge through the epistemological procedures of Whiteheadian concrescence.

In "Science and Theology as Complementary Perspectives" Fraser Watts affirms a referential realism in which the domains of the reality of science and religion coinhere. In his view science and religion approach reality from such different perspectives that they become quite distinct discourses. They are complementary in a way exemplified by the mind-body problem. Because he assumes that there is no underlying fundamental metaphysical language for relating mind and brain, Watts shows the radical disparity between mind-language and brain-language. Similar claims are made for more general science-language and God-language. My criticism of Watts is his apparent unawareness of the pioneering work of David Griffin, who reconciles the mind-body dilemma from a process perspective in his *Unsnarling the World Knot: Consciousness, Freedom, and the Mind-body Problem* (Berkeley: Univ. of California Press, 1998). Following Watts's analogy, Griffin's solution of the mind-body problem suggests a successful process understanding of the relationship of science and religion.

Niels Henrik Gregersen's "A Contextual Coherence Theory for the Science-Theology Dialogue" using Rescher's philosophy is essentially compatible with Whitehead. I wish that Gregersen and the other authors of the book had more seriously considered Whitehead's robust realism rather than presenting a somewhat puny one entailed by their mentalist presuppositions.

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The Human Person in Science and Theology. Edited by Niels Henrik Gregersen, Willem B. Drees, and Ulf Gorman. Edinburgh: T&T Clark, 2000. 230 pages. $25.00 (paper).

Niels Henrik Gregersen, a theologian at the University of Aarhus, Denmark, Willem B. Drees, chaired professor of nature and technology at the University of Twente, and Ulf Gorman, who teaches theology and religious studies at Lund University, Sweden, have assembled a solid series of essays in this book. Contributors to their collection, the product of a 1998 conference organized by the European Society for the Study of Science and Theology (ESSSAT), agree that prevailing notions of personhood must be seriously modified by philosophy and theology. They are unified in rejecting two conflicting modern views: the transcendence, or existential, view with its individualistic and subjectivist notions of the self (a synonym for person) and the physicalist view with its emphasis on the reduction of mental life to the deterministic computational biochemistry of the brain.

By near consensus, their preferred alternative is the "bio-cultural paradigm," designed to overcome the "bogus dichotomy between the personal and the em-

pirical" (p. 7). In this new model, the person, or self, is the offspring of two parents, biological and social. That is, a person is "embedded" (to use a term currently in fashion) in nature *and* nurture. In his informative introductory essay, Gregersen says that "the human person emerges as the result of the *interference* between the biological roots of human personhood and the cultural nexus of which any person is a part" (p. 6). The self, even in its spiritual portions, does not hover independently just beyond the brain's neural network. And the cherished autonomy of the individual is not the consequence of some inner aspect—the conscience or will—that defines its essence. Rather, like Arthur Koestler's Janus-faced "holon," the embedded self looks down to its biological foundation in the brain and up to its cultural environment as mutual sources for its origin. Neither of these dimensions alone is sufficient; both are necessary in any account of the human person.

The essays of the first of the book's two major parts circle in upon this major theme. Mary Midgley's "Consciousness, Fatalism, and Science" is rich with insightful commentary that dismantles the "ordinary humbug" of the physicalist model of mentality and volition. "The brain," she says, "is simply a part of us, a useful (but rather complicated) bit of meat packed inside our skulls. It does not make us think; we think with it, as we walk with our feet and digest with our internal organs" (p. 30). Midgley repeatedly returns to the image of the Chinese vase sitting on a table. The vase can be approached from many angles including its physical aspects, history, and function. All of these are integrated into a single whole in the same sense as the mind is integrated with the brain and the larger cultural context.

Fraser Watts, a psychologist and theologian, echoes Midgley in his essay "The Multifaceted Nature of Human Personhood." Watts argues for a balanced approach to the biological, individual, and social dimensions of religious experience as opposed to assigning primacy to any one of them. Hugo Lagercranz, a Swedish pediatrician, contributes a discussion of the incredible pliant infant brain. In "The Child's Brain" Lagercranz notes that 200,000 neurons are formed in the human fetus *every minute* between the eighth and eighteenth gestational weeks. Then nearly half of these neurons formed in the womb disappear in early infancy as the brain rushes to organize itself in response to experience, including, presumably, cultural experience. So much for strict neurogenic determinism.

Philip Hefner, editor of *Zygon* and past director of the Zygon Center for Religion and Science in Chicago, and Michel Welker, who teaches theology at the University of Heidelberg, conclude the book's first part with essays that argue strongly for Gregersen's notion of the person arising from the "interface between the biological roots and cultural nexus." In addition to his thesis that the construction of the human person is a response to biological or evolutionary and cultural conditions, Hefner offers the further important insight that "the formation of our personhood is . . . a theological transaction" (p. 86). We are indeed *imago Dei*, in the image of God. Following Wolfhart Pannenberg in rejecting the idea that God is a projection of the perfected human person on the screen of the cosmos, Hefner maintains that early humans became persons by relating to the divine as the personal source of order in the contingent stream of events in nature. This historical relation with a Thou witnessed in religious traditions continues to

fashion our character as authentic and open persons. Welker rejects the traditional image of the private self "behind the mask" striving to protect itself and remain consistent with the public self in front of the mask. This subjective *I* runs into trouble in contemporary culture where market and media forces threaten to destroy its precious autonomy. The new task of theology, he concludes, is to "work on a new description" of the self that removes this obsolete dichotomy.

The essays in Part 2, "Supervenience, Mind, and Culture," examine the notion currently debated in the dialogue between science and theology that, although constituted by brain states, mental events are not reducible to these states and may, according to some commentators, even influence brain states through a teleological (purpose-oriented) top-down causality. Enter culture. Mental events arise out of a nexus or network of social meaning, institutional and linguistic, for example, and constitute a relational notion of the person. Hence, neither mentality nor personhood can be explained entirely by brain chemistry or physics.

Dennis Bielfeldt, a professor of philosophy and religion at South Dakota State University, introduces "the peril and promise of supervenience." In the midst of heavy going here, the reader will readily agree with the author's own assessment. "It should be obvious from this essay," he says, "that supervenience is a rather technical philosophical notion that admits of various formulations" (p. 146). Bielfeldt praises supervenience for eliminating dualism and the reducibility of whole to part—both positive results for theology. But he is less than sanguine about downward causation of either the mind on the brain or God on the physical world. What is worse, just as mind emerges from states of the brain, so a god modeled on supervenience emerges from the states of the material world—a conclusion theists will find entirely unpalatable.

In another well-argued but challenging piece, Gregersen develops an alternative version of nonreductive and holistic supervenience and applies the notion to the Lutheran theology of the Eucharist. This task is carried forth by enlisting Karl Popper's framework of three worlds: the worlds of physical facts, mental states, and human culture. While this is an insightful and constructive exercise, its technical arguments may be confusing to the uninitiated reader.

In a final essay, John Teske, who teaches psychology at Elizabethtown College in Pennsylvania, carries the biocultural paradigm to its logical conclusions. His thesis is that "the human spirit can be understood as a social and historical construction, dependent upon but not determined by human neuropsychology, in turn embedded within the evolutionary emergence of evolutionary processes" (p. 190). Teske uses *spirit* somewhat like others use *person* or *self*. The self is contingent, radically relational, and socially constructed and is best understood through narrative, an approach totally unsuited to physicalist models of the mind.

The Human Person is an exceedingly competent effort to give voice to a reasonable alternative to the highly visible advocates of narrow reductionistic physicalism. More than simply a defensive response, however, the biocultural paradigm it advocates provides a welcome opportunity for further important theological construction that many *Zygon* readers will find exciting.

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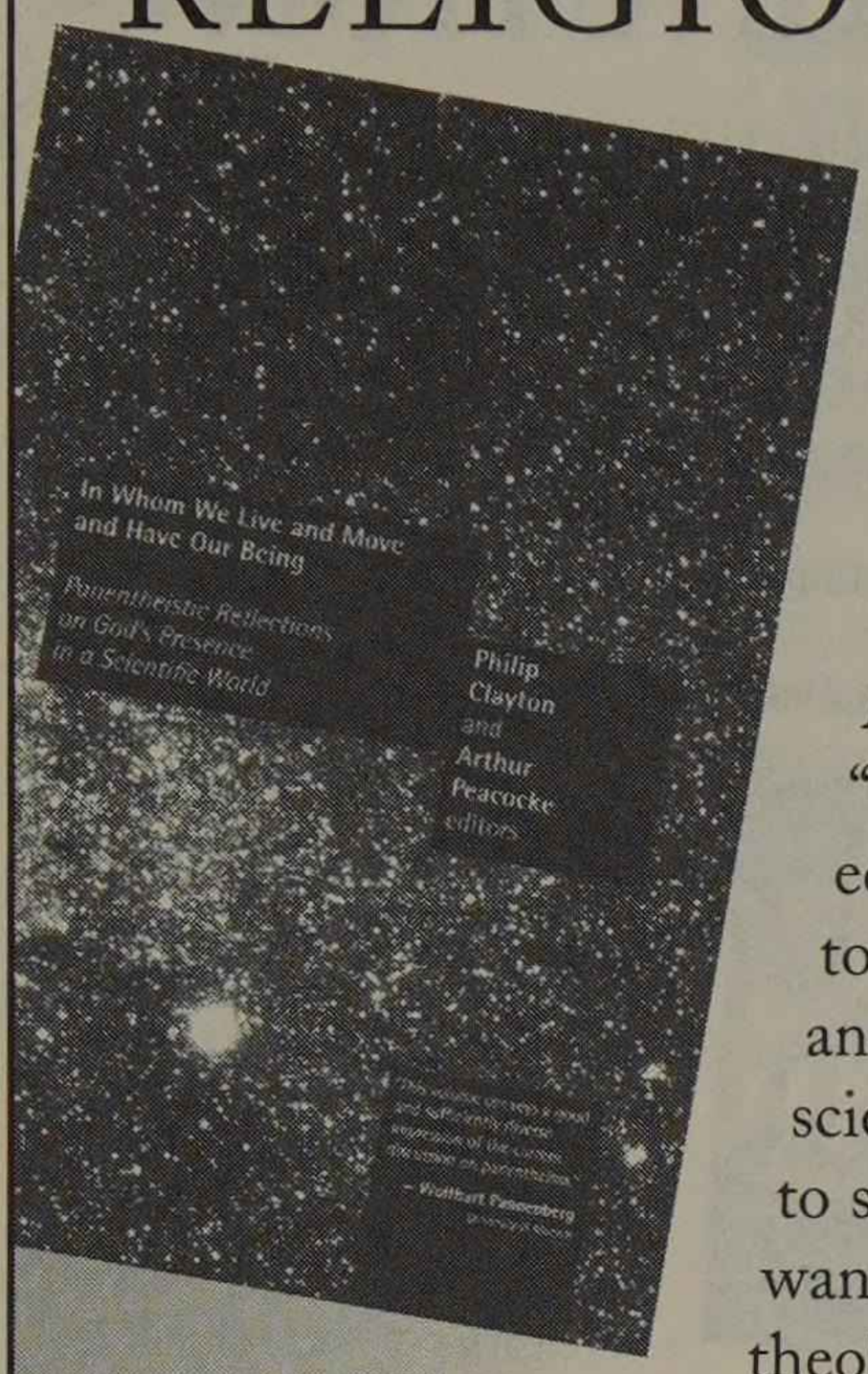

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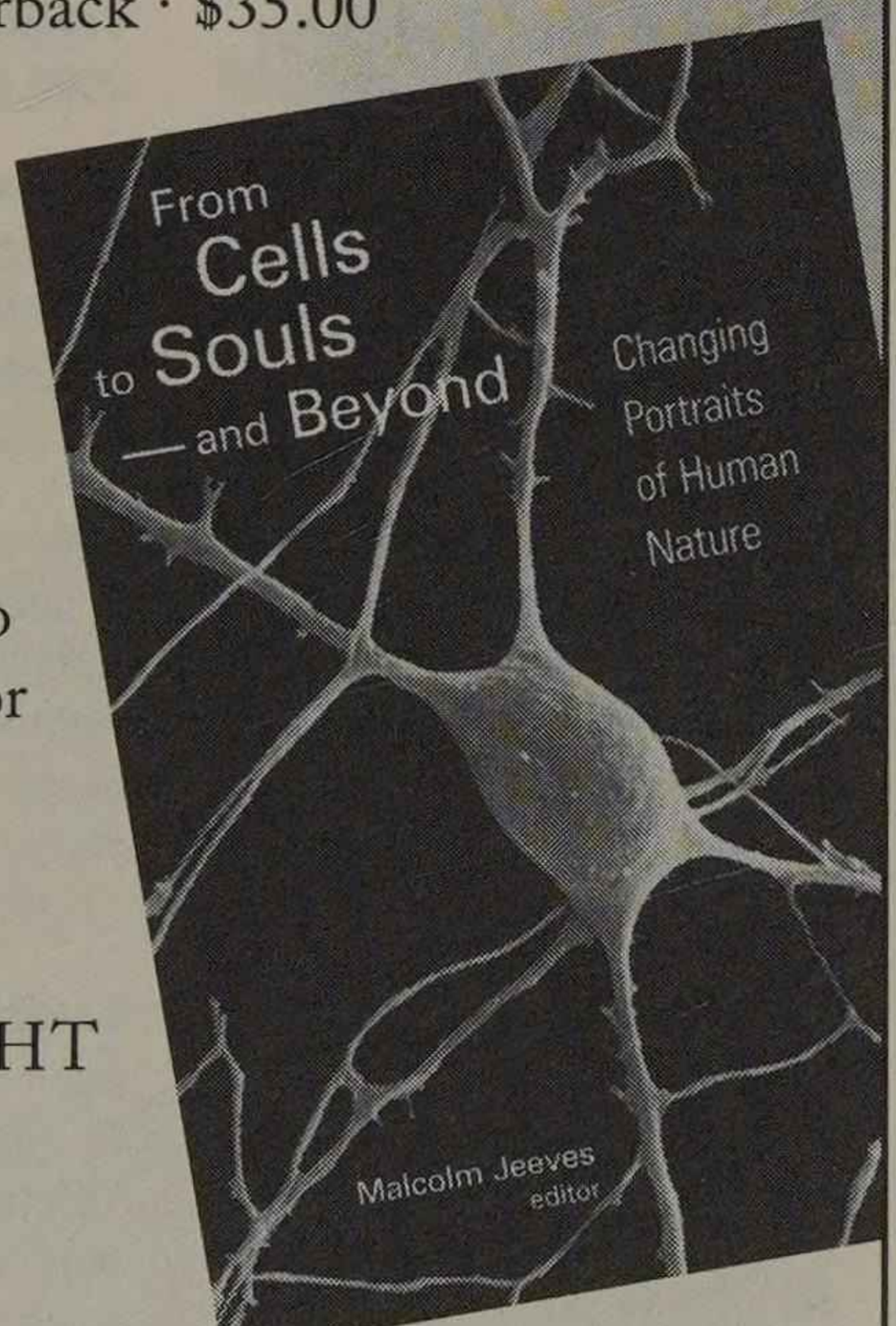

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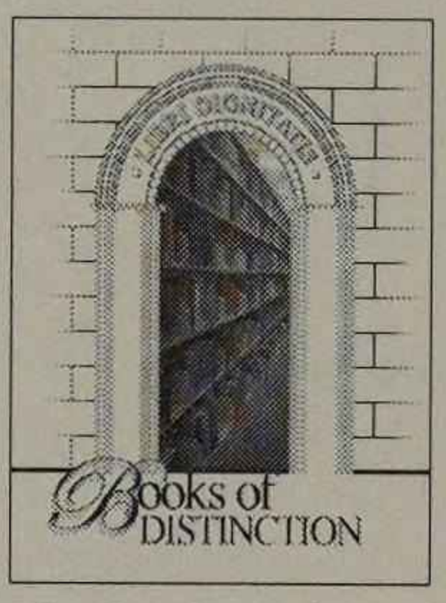

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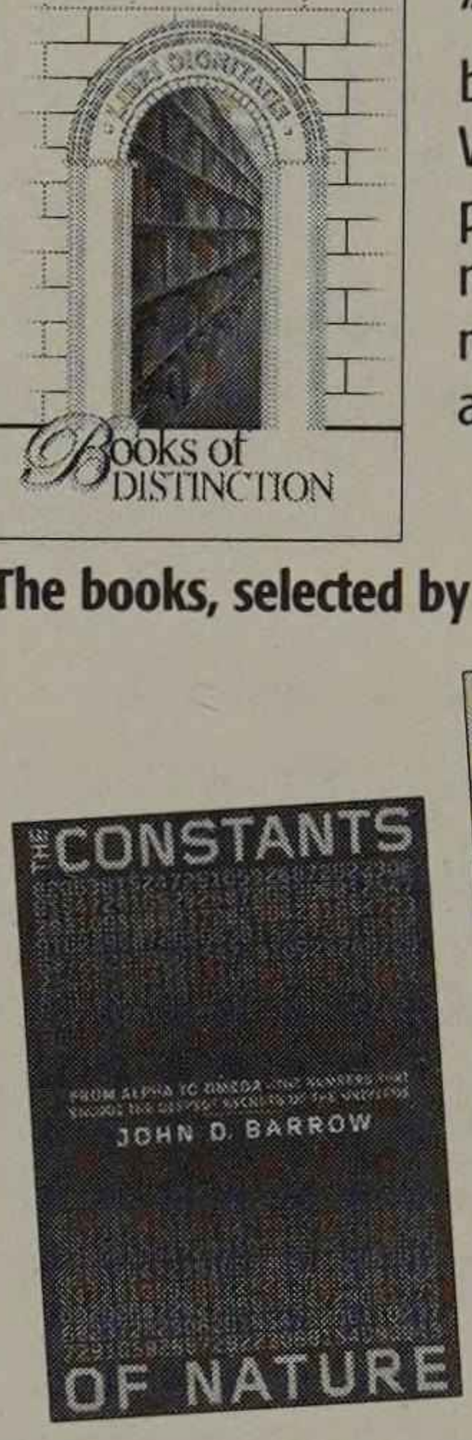
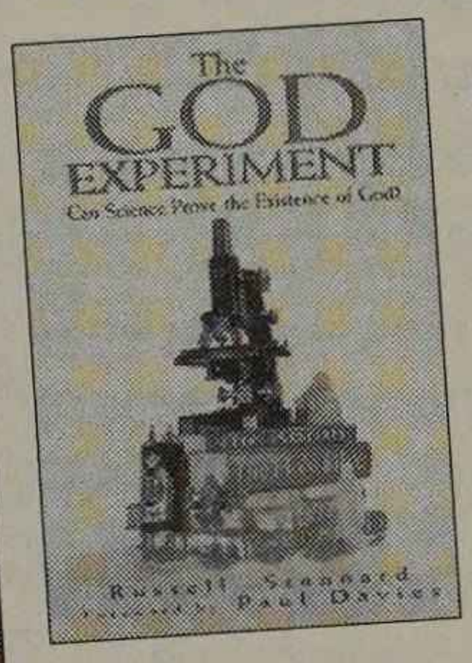
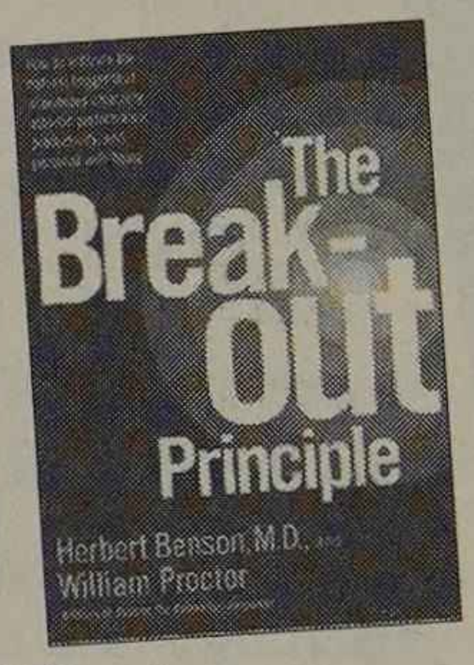






Science and Religion

Barbour, Ian G. *When Science Meets Religion: Enemies, Strangers, or Partners?* Harper San Francisco, 2000, 006060381X, $16.95, paper.

Barrow, John D. *The Constants of Nature: From Alpha to Omega – The Numbers That Encode the Deepest Secrets of the Universe*. Pantheon Books, 2003, 0375422218, $26.00, cloth.

Berry, R.J. *The Care of Creation: Focusing Concern and Action*. InterVarsity Press, 2000, 0830815562, $18.00, paper.

Brown, Warren S., Nancey Murphy, and H. Newton Malony. *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*. Augsburg Fortress Publishers, 2003, 0800631412, $19.00, paper.

Clayton, Philip. *The Problem of God in Modern Thought*. William B. Eerdmans Publishing, 2000, 0802838855, $39.00, cloth.

Davies, Paul. *The Fifth Miracle: The Search for the Origin and Meaning of Life*. Simon & Schuster, 2000, 068486309X, $14.00, paper.

Deane-Drummond, Celia and Bronislaw Szerszynski, with Robin Grove-White. *Reordering Nature: Theology, Society and the New Genetics*. T & T Clark Publishers, 2003, 0567088782, $29.95, paper.

Gregersen, Niels Henrik. *From Complexity to Life: On the Emergence of Life and Meaning*. Oxford University Press, 2002, 0195150708, $19.95, cloth.

Haught, John F. *Deeper Than Darwin: The Prospect for Religion in the Age of Evolution*. Westview Press, 2003, 0813365902, $26.00, cloth.

Jammer, Max. *Einstein and Religion: Physics and Theology*. Princeton University Press, 2002, 069110297X, $16.95, paper.

Matthews, Clifford N., Mary Evelyn Tucker, and Philip Hefner. *When Worlds Converge: What Science and Religion Tell Us about the Story of the Universe and Our Place in It*. Open Court Publishing, 2001, 0812694511, $28.95, paper.

Peacocke, Arthur. *Paths from Science towards God: The End of All Our Exploring*. Oneworld Publications, 2001, 1851682457, $16.95, paper.

Peters, Ted and Gaymon Bennett. *Bridging Science and Religion*. Augsburg Fortress Press, 2003, 0800636252, $17.00, paper.

Peters, Ted, Robert John Russell, and Michael Welker. *Resurrection: Theological and Scientific Assessments*. William B. Eerdmans Publishing, 2002, 0802805191, $29.00, paper.

Polkinghorne, John. *Belief in God in an Age of Science*. Yale University Press, 2003, 0300099495, $9.95, paper.

Polkinghorne, John and Michael Welker. *The End of the World and the Ends of God: Science and Theology on Eschatology*. Trinity Press International, 2000, 1563383128, $27.00, paper.

Pollack, Robert. *The Faith of Biology and the Biology of Faith*. Columbia University Press, 2000, 0231115067, $21.95, cloth.

Ravindra, Ravi. *Science and the Sacred: Eternal Wisdom in a Changing World*. Quest Books, 2002, 0835608204, $21.95, paper.

Russell, Robert John, John Polkinghorne, Philip Clayton, and Kirk Wegter-McNelly. *Quantum Mechanics: Scientific Perspectives on Divine Action*. University of Notre Dame Press, 2002, 026803978X, $21.95, paper.

Stannard, Russell. *The God Experiment: Can Science Prove the Existence of God?* Hidden Spring, 2000, 1587680076, $20.00, cloth.

Thuan, Trinh Xuan. *Chaos and Harmony: Perspectives on Scientific Revolutions of the 20th Century*. Oxford University Press, 2000, 0195129172, $35.00, cloth.

van Huyssteen, J. Wentzel. *The Shaping of Rationality: Toward Interdisciplinarity in Theology and Science*. William B. Eerdmans Publishing, 1999, 0802838685, $35.00, cloth.

Spirituality and Health

Benson, Herbert and William Proctor. *The Breakout Principle: How to Activate the Natural Trigger That Maximizes Creativity, Athletic Performance, Productivity, and Personal Well-Being*. Scribner Book Company, 2003, 0743223977, $25.00, cloth.

Matthews, Dale A. with Connie Clark. *The Faith Factor: Proof of the Healing Power of Prayer*. Penguin Group, 1999, 0140275754, $15.00, paper.

Tolson, Chester L. and Harold G. Koenig. *The Healing Power of Prayer: The Surprising Connection between Prayer and Your Health*. Baker Books, 2003, 0801012554, $16.99, cloth.

Religion

Armstrong, Karen. *Islam: A Short History*. Modern Library, 2000, 0679640401, $19.95, cloth; Modern Library, 2002, 081296618X, $11.95, paper.

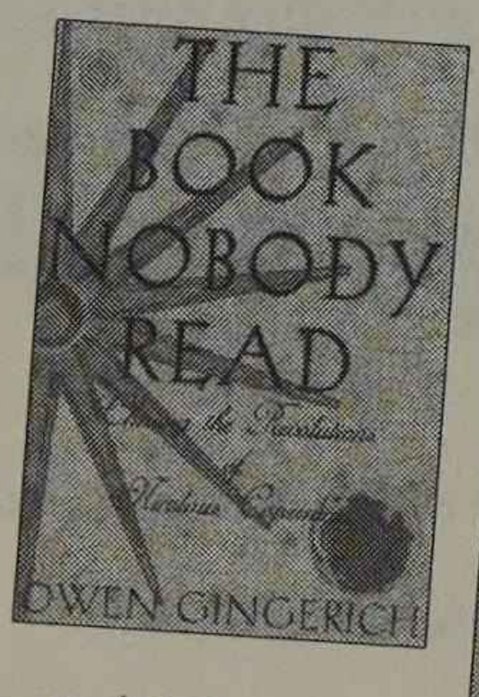
Marty, Martin E. *Martin Luther: A Penguin Life*. Viking Penguin, 2004, 0670032727, $19.95, cloth.

Nasr, Seyyed Hossein. *The Heart of Islam: Enduring Values for Humanity*. Harper San Francisco, 2002, 0060099240, $22.95, cloth.

Polkinghorne, John and Michael Welker. *Faith in the Living God: A Dialogue*. Augsburg Fortress Publishers, 2001, 0800634349, $17.00, paper.

Post, Stephen G. *Unlimited Love: Altruism, Compassion, and Service*. Templeton Foundation Press, 2003, 1932031316, $24.95, paper.

Ward, Keith. *God: A Guide for the Perplexed*. Oneworld Publications, 2002, 1851682848, $24.95, cloth.



Psychology

Gardner, Howard, Mihalyi Csikszentmihalyi, and William Damon. *Good Work: When Excellence and Ethics Meet*. Basic Books, 2002, 0465026087, $17.50, paper.

Myers, David. *Intuition: Its Power and Perils*. Yale University Press, 2002, 0300095317, $24.95, cloth.

Myers, David and Malcolm A. Jeeves. *Psychology through the Eyes of Faith*. Harper San Francisco, 2003, 0060655577, $14.95, paper.

Ramachandran, V.S. and Sandra Blakeslee. *Phantoms in the Brain: Probing the Mysteries of the Human Mind*. Quill, 1999, 0688172172, $16.00, paper.

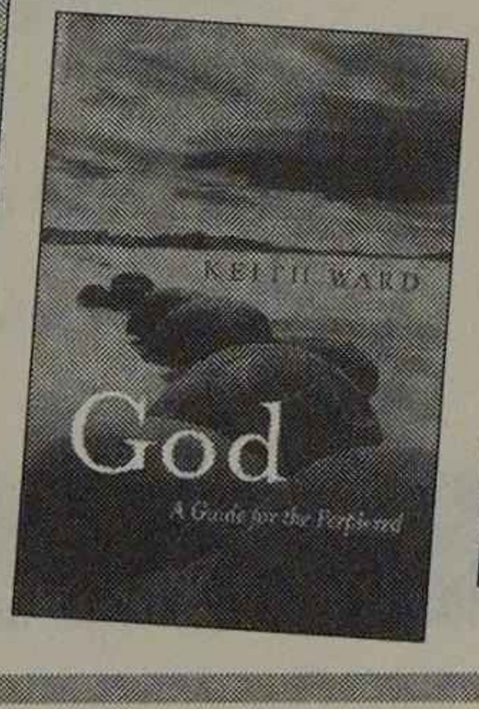
Worthington, Everett L. *Forgiving and Reconciling: Bridges to Wholeness and Hope*. InterVarsity Press, 2003, 0830832440, $15.00, paper.

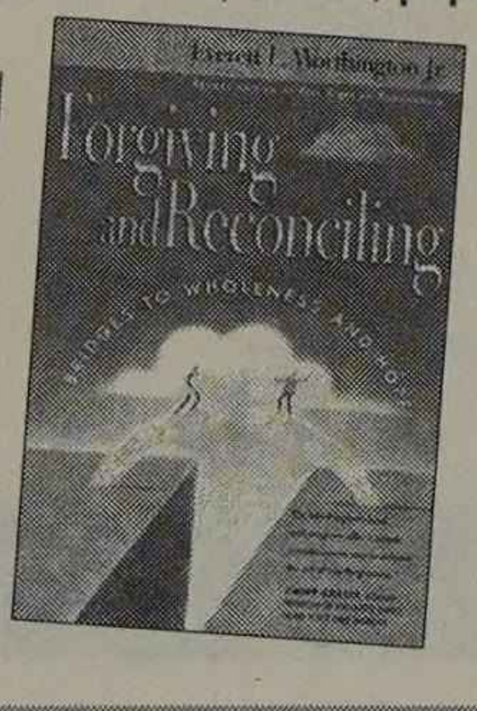
Science

Ferguson, Kitty. *Tycho and Kepler: The Unlikely Partnership That Forever Changed Our Understanding of the Heavens*. Walker & Company, 2002, 0802713904, $28.00, cloth.

Gingerich, Owen. *The Book Nobody Read: Chasing the Masterpiece of Nicolaus Copernicus*. Walker & Company, 2004, 0802714153, $25.00, cloth.

Townes, Charles H. *How the Laser Happened: Adventures of a Scientist*. Oxford University Press, 2002, 0195153766, $14.95, paper.





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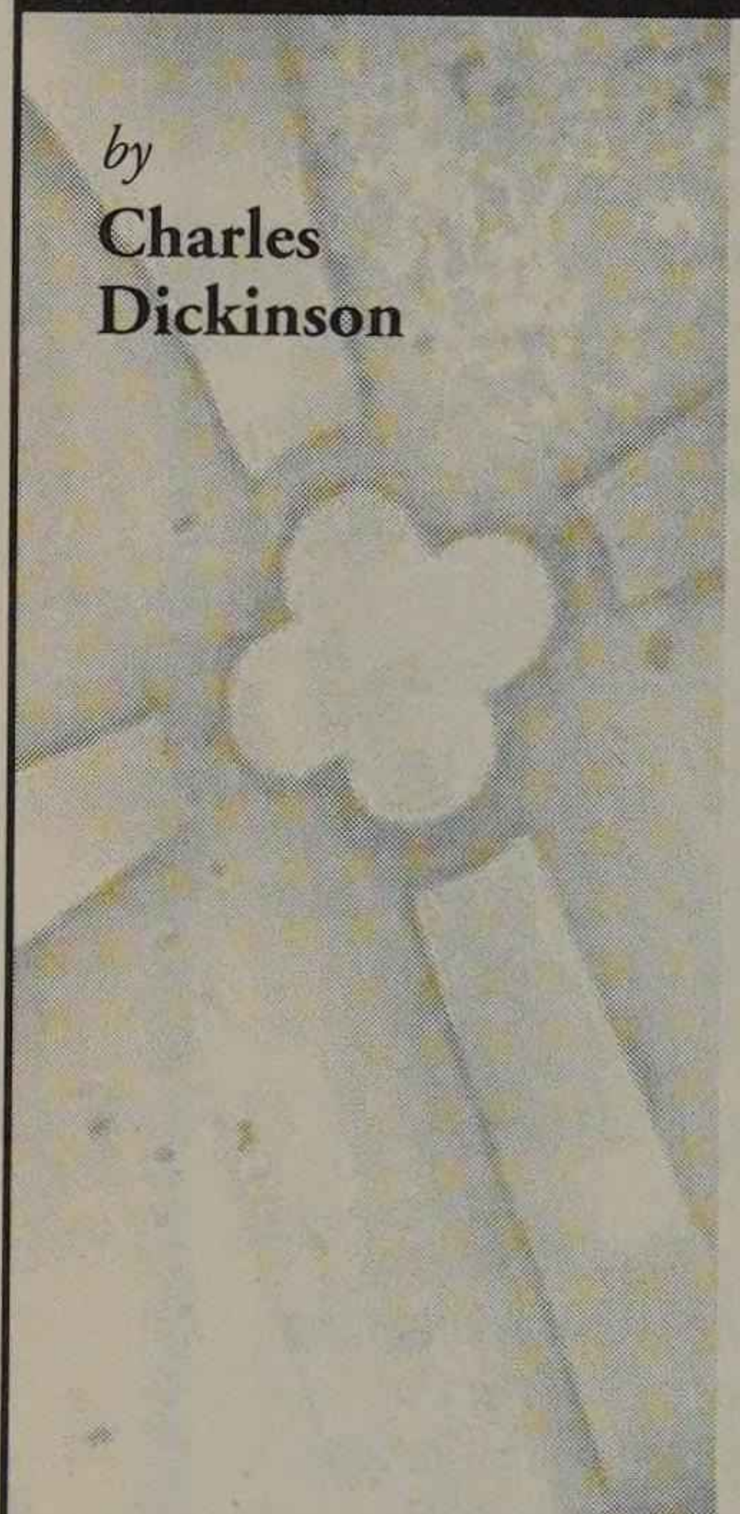
The Dialectical Development of Doctrine

A Methodological Proposal

by
Charles Dickinson



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If Christianity—including Christian faith and theology—is to avoid becoming totally out of touch with the world—a museum piece at best, a force of baleful reaction at worst—it must constantly update itself by constant interaction, dialogue, dialectic with all the important intellectual currents, movements, disciplines of today. In the process, it must not lose its soul, or else it becomes useless. But, as Friedrich Schleiermacher said, it must open its windows to the world, lest it become irrelevant or even harmful.

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