

Magazine Reprint Series

## The Real Evolution Debate

Everything you always wanted to know  
about evolution but the mass media  
wouldn't tell you

by the editors of *WIE*



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# The **REAL** Evolution Debate

Everything you always wanted to know about  
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**YOU'VE SEEN THE PAPERS.** You've watched the TV reports. You know how the debate on evolution is always framed. Darwin vs. God. Science vs. religion. Evolution vs. creationism. Reason and rationality vs. belief and faith. That's the evolution debate we hear about in the mass media these days, the one that is causing consternation everywhere from Kansas school boards to Pennsylvania courthouses.

But even as the culture wars rage and endless straw men are sent to their graves, we at *WIE* would like to suggest a different approach. Because what is portrayed about evolution in today's media more often than not implies a false choice, an artificial polarization between two extremes. In fact, there is another evolution debate going on behind the scenes, one that is broader, deeper, subtler, and much more profound. And it's not just a debate between science and spirituality. It's also about *what kind of science and what kind of spirituality* we are talking about.

So with that thought in mind, the editors of *What Is Enlightenment?* set out this past summer to uncover the *real* evolution debate—to chart those exciting evolutionary

theories in both science and spirituality that are causing us to redefine the nature of the evolutionary process and to rethink our conclusions about where we come from, who we are, and where we might be going. Yes, there are still those who say it's all a cosmic accident and that's the end of it, and those who say it's all perfectly planned by God and *that's* the end of it. But somewhere in between, there are exciting new ideas that are destined to shake the foundations of the way we understand life in the twenty-first century.

So instead of two categories we have twelve, instead of black and white, we have a whole spectrum of colors. Together they paint a much more interesting, more challenging, and most importantly, more *accurate* picture of how evolution is being perceived in the spiritual, philosophical, and scientific circles that are helping define the leading edge of contemporary culture. And they show one fact unequivocally: At the beginning of 2007, how we understand the nature of evolution is itself evolving in ever-surprising ways. As it does, it continues to radically alter the way we perceive our world, and the world to come.

C.P.



# Evolution through the Lens of Science and Spirit

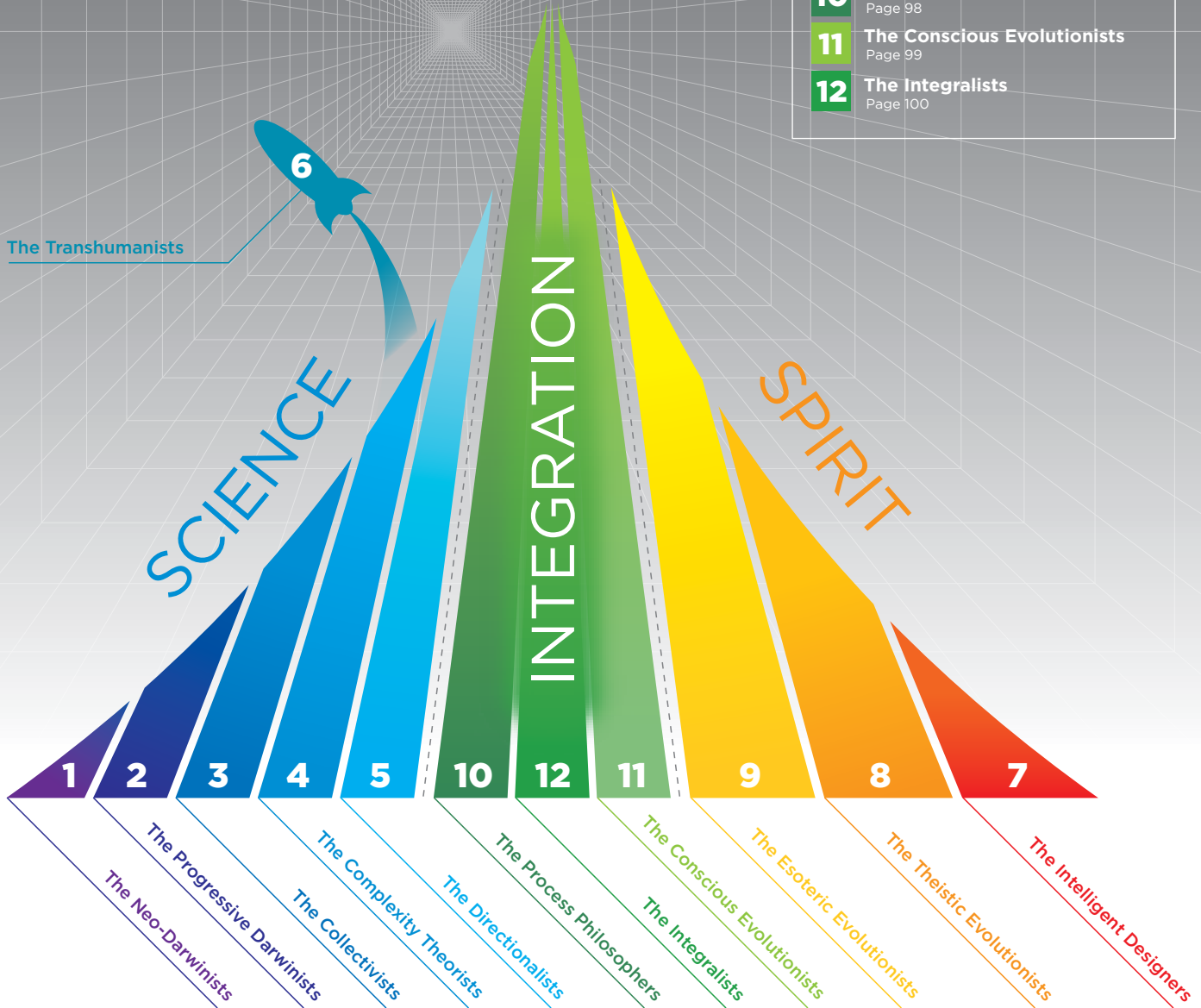
Between the Neo-Darwinists on one side and the Intelligent Designers on the other are at least ten more "schools" of evolutionary thought. Here, we've spread them out along a spectrum from science to spirit, with scientific materialism on the far left and religious determinism on the far right. Generally speaking, the closer a group of scientific thinkers appears to the center of the chart, for example, the closer its view of evolution comes to integrating the dimension of spirit, and vice versa—an integration that manifests most fully in the three groups in the middle.



Read the web-enhanced Real Evolution Debate online, with links to interviews, articles, and more. [wie.org/evodebate](http://wie.org/evodebate)

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**“We are survival mechanisms—robot machines blindly programmed to preserve the selfish molecules known as genes.”**

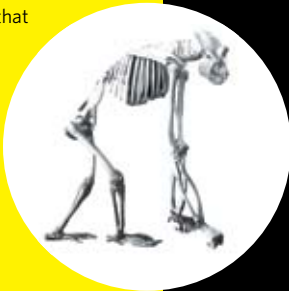
Richard Dawkins



## DID YOU KNOW?

### Going Somewhere?

Stephen Jay Gould (1941–2002), one of the most brilliant and passionate scientists of the twentieth century, was renowned for his insistence that life is an accident and evolution is in no way a directional process. It was a belief shared by fewer and fewer toward the end of his life—even famous Neo-Darwinists such as Dennett and Wilson concede that evolution appears to have some direction toward greater complexity. Gould nevertheless insisted that we have to “abandon progress or complexification as a central principle [of evolution] and come to entertain the strong possibility that *H. sapiens* is but a tiny, late-arising twig on life’s enormously arborescent bush—a small bud that would almost surely not appear a second time if we could replant the bush from seed and let it grow again.”



# 1 The Neo-Darwinists

## CORE IDEA

Evolution and biological complexity are the products of random mutation and natural selection at the level of genes.

## WHAT THEY SAY . . .

Darwin’s theory of evolution by natural selection hinged on the idea that advantageous traits in an organism would enable it to better adapt to its environment and thus survive to reproduce. But he could never figure out *how* these traits were passed on from parent to offspring. It wasn’t until twenty years after his death, when scientists unearthed Gregor Mendel’s discovery of genetics, that an answer was found. Through the marriage of Darwin’s and Mendel’s ideas, the Neo-Darwinists created what’s called the “modern evolutionary synthesis,” which says that natural selection is the *mechanism* of evolution and genes are the *units* on which it operates. What accounts for biodiversity and novelty, they argue, are random mutations in genetic material, which give the organism an evolutionary advantage and which are then passed on to the next generation.

Thus, evolution really boils down to this competition of genes for survival, or their “selfishness,” as Richard Dawkins famously put it. During the 1970s, entomologist E.O. Wilson created the field of sociobiology based on this idea, arguing that human behavior is influenced by genes and their impetus to reproduce. Over the last decade, Neo-Darwinists have also used the gene-centric perspective to examine everything from consciousness (Daniel Dennett) to the human race’s historical tendency to believe in a God (Dawkins).

## WHAT IT MEANS . . .

The significance of Neo-Darwinism can’t be overstated. For nearly a century it has exerted a foundational influence over all other evolutionary theories, and it remains the dominant view held by both the scientific establishment and the cultural mainstream today. In recent decades, however, it has come under attack from two different fronts. On the one hand, scientists have argued that Neo-Darwinism’s narrow focus on random mutation and natural selection doesn’t nearly begin to explain the processes we observe in the natural world. On the other hand, many religious scholars, such as Huston Smith, criticize the Neo-Darwinists for the antireligious conclusions that are common in the field and for their insistence that all causal mechanisms of evolution must be material, which they point out is a philosophical conclusion, not a scientific one. It’s a criticism that is gaining currency in the culture at large. Literary critic Leon Wieseltier, for instance, wrote recently in the *New York Times*, “Scientism, the view that science can explain all human conditions and expressions, mental as well as physical . . . [is] one of the dominant superstitions of our day.”

## MAJOR FIGURES

Richard Dawkins  
Daniel Dennett  
Edward O. Wilson

## MAJOR WORKS

*Sociobiology* (Wilson, 1975)  
*The Selfish Gene* (Dawkins, 1976)  
*Biophilia* (Wilson, 1984)  
*Darwin’s Dangerous Idea* (Dennett, 1995)  
*The Structure of Evolutionary Theory*  
(Gould, 2002)

## INFLUENCES

Charles Darwin (1809–1882)  
Gregor Mendel (1822–1884)  
August Weismann (1834–1914)  
Thomas Hunt Morgan (1866–1945)  
Julian Huxley (1887–1975)  
R.A. Fisher (1890–1962)  
Theodosius Dobzhansky (1900–1975)  
Ernst Mayr (1904–2005)

## 2

## The Progressive Darwinists

## CORE IDEA

Genetic mechanisms are far more complex than previously thought; moreover, we now know there are several nongenetic systems of heredity that also influence the evolutionary process.

## WHAT THEY SAY . . .

In the early 1990s, scientists began to discover that all life forms come from a startlingly limited number of genes. Humans, for example, have only twenty-five thousand genes, and we share 50 percent of them with *bananas*. How is it possible that we have so much in common genetically with a yellow fruit? A relatively new field called evolutionary developmental biology, or “evo-devo,” is tackling this question (among many others) by exploring the relationship between an organism’s development from embryo to adulthood and that organism’s genes. It has been discovered, for example, that seemingly random sequences of DNA, also known as “junk DNA,” act as “molecular fingers” that switch nearby genes on and off during development. Thus, part of how nature produces “endless forms most beautiful,” to use Darwin’s poetic phrasing, appears to be through the infinite combinations and patterns created when different genes are turned on or off at different times.

There is also growing evidence that organisms can switch their genes on or off in response to their environment, and that the *memory* of this gene activity can be passed on to subsequent generations. This happens through what’s called “epigenetics”—the nongenetic transfer of information through cells—and is only one of many systems of heredity that progressive scientists are now discovering influence evolution. So far, two other systems of heredity have been proposed in addition to the genetic and epigenetic: behavioral and symbolic (language).

## WHAT IT MEANS . . .

The work of these forward-thinking scientists is showing that natural selection acting upon random mutations of DNA is only a small part of the scientific story when it comes to explaining evolution. The incredible biodiversity of life is the product of a more complex, elegant, and subtle interplay between genes, cells, parents, offspring, and the environment than perhaps anyone imagined. One result of these discoveries is that we now know that systems of heredity *themselves* are evolving, and some profound questions once off limits to “serious” scientists (for instance, Can organisms direct their own evolution?) are now becoming unavoidable.

“There is a new sense of humility. . . . The discoveries being made show how enormously complicated everything is. . . . The popular conception of the gene as a simple causal agent is not valid.”

Eva Jablonka and Marion Lamb



## DID YOU KNOW?

## Morphogenetics

Biologist Rupert Sheldrake’s theory of morphogenetics, which suggests that all organisms influence and are shaped by a nonphysical morphic field made up of the collective memory of their species, has been treated with skepticism and branded as pseudoscience since the 1980s. However, as scientists expand their understanding of how information can be passed from generation to generation, including new research into cellular memory (epigenetics), mainstream science is one step closer to Sheldrake’s unorthodox work.

## MAJOR FIGURES

Wallace Arthur  
Sean Carroll  
Eva Jablonka  
Marion Lamb  
Bruce Lipton  
Stuart Newman  
Mary Jane West-Eberhard

## MAJOR WORKS

*Ontogeny and Phylogeny* (Gould, 1977)  
*The Origin of Animal Body Plans* (Arthur, 1997)  
*Shaping Life* (Smith, 1998)  
*From DNA to Diversity* (Carroll, Grenier, and Weatherbee, 2001)  
*Evolution in Four Dimensions* (Jablonka and Lamb, 2005)  
*Endless Forms Most Beautiful* (Carroll, 2005)

## INFLUENCES

Jean-Baptiste Lamarck (1744–1829)  
Etienne Geoffroy Saint-Hilaire (1772–1844)  
Ernst Haeckel (1834–1919)  
Jacques Monod (1910–1976)  
Edward B. Lewis (1918–2004)  
John Maynard Smith (1920–2004)  
Stephen Jay Gould (1941–2002)

**“We do not deny the importance of mutations. Rather we insist that random mutation, a small part of the evolutionary saga, has been dogmatically overemphasized. The much larger part of the story of evolutionary innovation, the symbiotic joining of organisms . . . has systematically been ignored by self-proclaimed evolutionary biologists.”**

Lynn Margulis

## 3 The Collectivists

### CORE IDEA

Evolution is driven not only by competition between genes but also by symbiogenesis, cooperation, and altruism between organisms.

### WHAT THEY SAY . . .

In 1966, Lynn Margulis published a landmark paper in which she argued that millions of years ago, protozoans symbiotically acquired photosynthetic plant cells and that, working together, they eventually developed into an entirely new life form—the eukaryote or multicelled organism. Margulis and her notion of “symbiogenesis” were scoffed at by Neo-Darwinists, who represented the status quo of the scientific community at the time, because evidence of cooperation in biology directly contradicted their theory of the “selfish gene.” For twenty years, Margulis fought for her work to gain acceptance, and eventually her tenacity paid off. Today the idea that symbiogenesis is one of the mechanisms of evolution is taught in the majority of high school biology classes.

Proof of cooperation in nature has also informed the work of David Sloan Wilson, who in the early 1970s pushed the Neo-Darwinian fold even further by resurrecting the theory of group selection—the idea that individuals can cooperate rather than compete with one another and become social groups that are “so functionally integrated they become higher-level organisms in their own right.” In this way, Wilson argues, natural selection takes place not only at the level of DNA but also between groups of animals and entire ecosystems—a process he calls “multi-level selection.” Using the idea of group selection to explain the development of human history and culture, the former media publicist and rogue scientific theorist Howard Bloom writes, “Evolution is not just a competition between individuals. It is a competition between networks, between webs, between group souls.”

### WHAT IT MEANS . . .

You’d be hard-pressed to find Wilson or Margulis talking about direction, purpose, or spirituality in evolution. He tends to reduce God and religion to biological instincts, and she shares many of the naturalistic proclivities of her former husband, Carl Sagan. But their accomplishments are something all subsequent biologists and theorists should be thankful for. They expanded the conceptual boundaries of the mechanics of evolution and were among the first to question the reigning orthodoxy of Neo-Darwinism. The implications of their work are profound: by showing that cooperation is fundamental to the nature of life and the evolutionary process, they’ve helped to galvanize paradigm shifts in fields beyond science, such as politics, psychology, philosophy, and movements for social change.

### DID YOU KNOW?

#### Living Systems Design

Evolutionary biologist, futurist, and business consultant Elisabet Sahtouris uses the principles of cooperation, altruism, and symbiosis found in biology to inform new models for organizations, economies, and societies in what she calls “Living Systems Design.” Unlike most of her scientific colleagues, Sahtouris brings a deep appreciation for the role of consciousness to her work, delving into the critical philosophical and spiritual issues of our day and envisioning “a scenario in which science leads the way out of our global problems and helps unite us into the flourishing global community I believe is on Earth’s evolutionary agenda for humanity.”



#### MAJOR FIGURES

Howard Bloom  
Lynn Margulis  
David Sloan Wilson

#### MAJOR WORKS

*Microcosmos* (Margulis, 1987)  
*Unto Others* (Wilson, 1998)  
*The Lucifer Principle* (Bloom, 1995)  
*Global Brain* (Bloom, 2000)

#### INFLUENCES

Konstantin Merezhkovsky (1855-1921)  
Andreas Schimper (1856-1901)  
Ivan Emmanuel Wallin (1883-1969)  
V.C. Wynne-Edwards (1906-1997)



# 4

## The Complexity Theorists

### CORE IDEA

Evolution occurs not simply through natural selection or random “tinkering” but through the capacity of dynamic complex systems to spontaneously produce higher forms of order.

### WHAT THEY SAY . . .

The advent of sophisticated computer-aided mathematics in the 1950s was an unexpected boon for evolutionary theory, giving rise to what is known as complexity science. Complexity science made it possible to find patterns in the complex, dynamic interactions within systems. Biologists found that this new mathematics let them approximate the actual complexity of nature—something that Neo-Darwinist models have been hard-pressed to do. Everything, say these Complexity Theorists, co-evolves. And by studying whole systems, they discovered something truly astounding: when a particular kind of dynamic system moves toward chaos and disequilibrium, at some point it spontaneously shifts into a more complex and integrated structure. Through this process of “self-organization” or “emergence,” something arises that is more than the sum of its parts and functions with greater autonomy. New potentials come into existence: agitated particles become atoms; stressed bacteria form cells; and this continues all the way up through cultural evolution and the formation of the global economy. Complexity science, they believe, might even have the answer to the biggest mystery of evolution—how something can emerge from nothing and then create everything. *How* this happens is far from clear, but *that* it happens is now indisputable.

### WHAT IT MEANS . . .

The discovery of the emergent properties of matter has excited the best minds in every scientific field. Despite fierce disagreements, they all concur that, as physicist Paul Davies writes, “Science is in principle able to explain the existence of complexity and organization at all levels, including human consciousness.”

Yet the capacity of the cosmos to everlastingly produce intricate beauty and order out of chaos does elicit almost a religious awe in these tough-minded scientists. Some even seem to adopt pantheism, which posits that the constant miracle of the natural world is “God.” Most, however, deny that there is anything actually mystical going on. Theoretical biologist Stuart Kauffman, for one, emphatically states that it is “utterly nonmysterious.” But Kauffman and others hold the process in such esteem that they look to evolution rather than to a transcendent God as the new source of ethical principles to guide human behavior.

### MAJOR FIGURES

Eric Chaisson  
Peter Corning  
Paul Davies  
Brian Goodwin  
Stuart Kauffman  
Ervin Laszlo  
David Loye  
Melanie Mitchell  
Lee Smolin

### MAJOR WORKS

*At Home in the Universe* (Kauffman, 1995)  
*Evolution: The General Theory* (Laszlo, 1996)  
*Holistic Darwinism* (Corning, 2005)  
*Epic of Evolution* (Chaisson, 2006)  
*How the Leopard Changed Its Spots* (Goodwin, 1994)

### INFLUENCES

Julian Huxley (1887–1975)  
Warren McCulloch (1899–1969)  
Ludwig von Bertalanffy (1901–1972)  
Ilya Prigogine (1917–2003)

“Self-organization may be the *precondition* of evolvability itself. Only those systems that are able to organize themselves spontaneously may be able to evolve further. How far we have come from a simple picture of [natural] selection sifting for fitter variants. Evolution is far more subtle and wonderful.”

Stuart Kauffman



### DID YOU KNOW?

#### Mystical Complexity

Why does the process of emergence lead to increased consciousness and intelligence? Ervin Laszlo, founder of the General Evolution Research Group, argues that the answer to that question lies in a new look at the most ancient wisdom—what he calls the “A-field.” The “A” stands for *Akashic*, which Indian philosophy describes as the etheric dimension from which all elements arise. Laszlo asserts that recent discoveries in vacuum physics corroborate the existence of this mystical realm, and he believes that the A-field is the hidden source of information that guides the direction of evolution. In this, Laszlo presents an innovative integration of Eastern and Western wisdom that he ambitiously calls a new “theory of everything.”



“How can [we] possibly overlook the evidence—or, at the very least, the appearance—of directionality in evolution: the sense that the force of evolution propels life inexorably toward ever-greater complexity, diversity, mastery over its environment, and, eventually, consciousness?”

James Gardner

## 5 The Directionalists

### CORE IDEA

The process of evolution is progressing toward broader and deeper cooperation and complexity—evidence, if not exactly proof, that it may even be shaped by some form of purpose or design.

### WHAT THEY SAY . . .

Each of these thinkers and synthesizers, whose work draws variously from the many streams of modern evolutionary science and philosophy, emphasizes the same basic premise: that evolution, far from being random and aimless, is unmistakably *directional*. In the long arc of both biological and cultural history, they see clear upward trends toward more and more cooperative interaction, richer and richer complexity, and ever-vaster webs of interdependence at all levels, from gene to cell to organism to society. As evolutionary psychologist Robert Wright puts it, the emergence of life and intelligence from the primordial ooze, if not quite divinely preordained, was nevertheless “so probable as to inspire wonder.”

### WHAT IT MEANS . . .

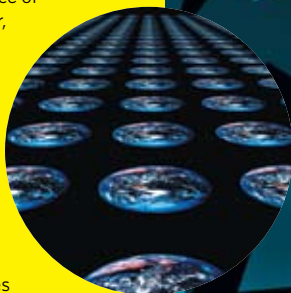
Building on the neo-Darwinian framework but drawing radically different conclusions about the nature of the evolutionary process, the Directionalists are coming out stronger than ever against anyone and everyone who seeks to reduce the epic of evolution to the mere story of selfish genes and cosmic accidents. And for this diverse array of evolutionary scholars, the recognition of directionality in evolution has repercussions far beyond biology: “We muddy the waters of the debate,” writes noted British paleontologist Simon Conway Morris, “if we fail to acknowledge that the processes of evolution have metaphysical implications for us.”

To be clear, these are scientific thinkers, not religious ones, and while some draw more than a little inspiration from mystic evolutionary philosophers such as Henri Bergson and Pierre Teilhard de Chardin, they stop well short of mysticism themselves. “Even if there were proof,” says Wright, “that evolution is teleological—a product of design, a process with a purpose—we would still be a long way from Teilhard de Chardin’s worldview, complete with a God and a happy ending.” But it is precisely by keeping the terms of their argument strictly within the bounds of science that they’ve been able to help wedge open the doorway to something more, making space within the prevailing orthodoxy of reductionism, materialism, and atheism for an account of evolution that can begin to transcend all three.

### DID YOU KNOW?

#### The Selfish Biocosm

Why are the physical laws of the universe so perfectly—and oddly—oriented toward the emergence of intelligent life? This is the question lawyer, complexity theorist, and science writer James Gardner asks in *Biocosm* and then proceeds to answer in a dizzyingly lucid blur of cosmic speculation. You might call him a Directionalist with an attitude. His “Selfish Biocosm” hypothesis—which one-ups Richard Dawkins by proposing that just like one massively supergigantic “selfish gene,” the entire universe is driven by the materialistic need to replicate itself—takes the search for overarching purpose and design about as far out as you can possibly get without veering into spiritual territory.



### MAJOR FIGURES

Simon Conway Morris  
James Gardner  
John Stewart  
Robert Wright

### MAJOR WORKS

*The Moral Animal* (Wright, 1995)  
*Evolution's Arrow* (Stewart, 2000)  
*Nonzero* (Wright, 2000)  
*Life's Solution* (Morris, 2003)  
*Biocosm* (Gardner, 2003)

### INFLUENCES

Henri Bergson (1859–1941)  
Pierre Teilhard de Chardin (1881–1955)

# 6

## The Transhumanists

### CORE IDEA

Human beings must take control of their continued evolution—primarily through bioengineering, cybernetics, nanorobotics, and other technological means.

### WHAT THEY SAY . . .

Often referring to themselves as “H+” (Human Plus), the Transhumanists are an eclectic group of individuals united in their conviction that biological evolution can take living creatures only so far. Humanity’s continued evolutionary progress, they believe, now depends on each of us wresting the reins of our common destiny from the turgid grip of Mother Nature and taking conscious control of the process ourselves—using every conceivable technological tool at our disposal. Inspired by Julian Huxley’s 1957 essay “Transhumanism,” which coined the term, the Transhumanists revere traditional humanistic values and beliefs (such as atheism) but are critical of humanists for not appreciating the radical ways in which emerging technologies are changing the very definition of what it means to be human.

According to Transhumanist pioneer Max More, these scientific advances include (but are not limited to) “neuroscience and neuropharmacology, life extension, nanotechnology, artificial ultraintelligence, and space habitation.” By enhancing our bodies, our minds, and our sociocultural environments with such “techno-utopian” tools, the Transhumanists believe that humanity will create for itself a whole new order of meaning and purpose—a world unified in an unrelenting surge of progress and possibility. “As humanism freed us from the chains of superstition, let transhumanism free us from our biological chains,” beseeches author Simon Young. And where will such freedom ultimately lead? Thinkers such as Ray Kurzweil and Frank Tipler suggest that the logical endpoint of human evolution is the complete mastery of all matter and energy in the universe.

### WHAT IT MEANS . . .

Yawning in the face of the Neo-Darwinists and just about every other breed of evolutionary theorist, the Transhumanists are here to take matters into their own hands. Brimming with insatiable optimism and more than a little faith in the power of science to cure all that ails our world, they are likely to inspire as many parts hope and wonder as caution and concern. Materialists to the core, they are frequently criticized for barely batting an eye at the ethical concerns surrounding topics like human cloning, biological immortality, and accelerating technological development. They counter such concerns with the assertion that transcending limitations is what being alive is all about. In the words of artificial brain designer Hugo de Garis, “The prospect of building godlike creatures fills me with a sense of religious awe that goes to the very depth of my soul and motivates me powerfully to continue, despite the possible horrible negative consequences.”

“Although version 2.0 of the human body is an ongoing grand project that will ultimately result in the radical upgrading of all our physical and mental systems, we will implement it one small, benign step at a time.”

Ray Kurzweil



### MAJOR FIGURES

|                 |                   |
|-----------------|-------------------|
| Nick Bostrom    | Hans Moravec      |
| Hugo de Garis   | Max More          |
| Robert Ettinger | David Pearce      |
| James Hughes    | Natasha Vita-More |
| Ray Kurzweil    | Simon Young       |

### MAJOR WORKS

*Brave New World* (A. Huxley, 1932)  
*Man into Superman* (Ettinger, 1972)  
*Neuromancer* (Gibson, 1984)  
*Robot* (Moravec, 1999)  
*Our Posthuman Future* (Fukuyama, 2002)  
*The Singularity Is Near* (Kurzweil, 2005)  
*Radical Evolution* (Garreau, 2005)  
*Designer Evolution* (Young, 2006)

### INFLUENCES

Pierre Teilhard de Chardin (1881-1955)  
 Julian Huxley (1887-1975)  
 Aldous Huxley (1894-1963)  
 Alan Turing (1912-1954)  
 Isaac Asimov (1920-1992)  
 Marvin Minsky (1927-)  
 Phillip K. Dick (1928-1982)  
 FM-2030 (1930-2000)

**“The first thing you understand is that the Darwinian theory isn’t true. It’s falsified by all of the evidence and the logic is terrible. When you realize that, the next question that occurs to you is, well, where might you get the truth? . . . I start with John 1:1. In the beginning was the word. In the beginning was intelligence, purpose, and wisdom. The Bible had that right. And the materialist scientists are deluding themselves.”**

Phillip Johnson

# 7

## The Intelligent Designers

### CORE IDEA

Certain features of the universe and earth’s biological complexity are best explained by an intelligent agent or cosmic designer, not an undirected process such as natural selection.

### WHAT THEY SAY . . .

Intelligent Design (ID) has gained popularity in the United States as an attractive alternative to both Darwinism and Creationism. Biologist Michael Behe argues that proof of a designer lies in “irreducibly complex” biological systems made up of hundreds of cooperative functional parts, like enzymes or antibodies. Behe, and others, believe these complex systems cannot have been produced via natural selection because if any one part of the system had been imperfect during the evolutionary process, the system as a whole would not have been functional and would therefore have offered no evolutionary advantage. One must deduce, Behe says, that these systems “were planned. The designer knew what the systems would look like when they were completed and then took steps to bring the systems about.” Proponents of ID also invoke a version of the anthropic principle, saying that the laws of physics are so fine-tuned to give birth to life that they could not have been created by chance.

### WHAT IT MEANS . . .

Just as Neo-Darwinists are criticized on two fronts, the scientific and the theological, so are Intelligent Designers. The scientific community accuses ID of pushing a Christian agenda under the guise of a scientific alternative to Neo-Darwinism when, in fact, ID has yet to provide any direct scientific evidence for its claims. And many theologians feel that ID’s conception of a creator is limited and uninspiring. Scholar and theologian John Haught, for instance, writes, “[At least evolutionary theory] lets us think of God as the source of novelty . . . and not just as the source of some humanly idealized order. Even the countless imperfect adaptations in the Darwinian story of life, so scandalous to advocates of design, can lead us to sense more palpably that the universe is still being created.”

Despite these serious criticisms, the popular press loves to portray the Intelligent Design movement in America as representative of all religious views on evolution in the same way it uses Neo-Darwinism to represent all scientific views, although neither representation is actually true.

### DID YOU KNOW?

#### Alien Intervention?

Proponents of Intelligent Design often posit a transcendent deity as the guiding hand behind life on earth, but there are other theorists who believe there may be *different* sources of intelligence at work. They suggest that “advanced beings”—whether from outer space, a parallel dimension, or the future—are the true progenitors of the human race, having modified our DNA since at least our Cro-Magnon days. Some thinkers, including physicist Paul Davies, hypothesize that we may even find evidence of such alien intervention, a calling card of sorts, inscribed deep in the structure of our genetic code.



### MAJOR FIGURES

Michael Behe  
William Dembski  
Phillip Johnson  
Stephen Meyer  
Charles Thaxton

### MAJOR WORKS

*The Mystery of Life’s Origin* (Thaxton, 1984)  
*Darwin on Trial* (Johnson, 1991)  
*Darwin’s Black Box* (Behe, 1996)  
*No Free Lunch* (Dembski, 2001)

### INFLUENCES

Dean Kenyon (c. 1940–)  
William Paley (1743–1805)  
Michael Polanyi (1891–1976)

# 8

## The Theistic Evolutionists

### CORE IDEA

The evolutionary processes of natural selection and random mutation are not contradictory with faith in a God who gives order to all existence. In fact, science and religion deal with different aspects of reality that complement each other.

### WHAT THEY SAY . . .

This camp, comprised mostly of liberal Christians and Jews, is growing in numbers as recent findings about evolution are bringing scientists to their knees in wonder. A number of them, such as Francis Collins, head of the Human Genome Project, are well-established scientists who started out agnostic (at best) but have been overwhelmed by the evidence for design and purpose in the universe. While it's not uncommon for people these days to value both scientific reason and religious faith, Theistic Evolutionists are actively exploring how one illuminates the other. They are the intellectual heirs of Francis Bacon and Isaac Newton, who spearheaded the scientific revolution in the seventeenth and eighteenth centuries, and understand themselves to be using their God-given intelligence to decipher the glory of God revealed in nature. Most of them see the exquisite attunement of the cosmos that enabled life to spontaneously emerge as a miraculous event that proves God's influence in creation. For Theistic Evolutionists, scientific reasoning is a way to deepen faith, and their faith gives greater meaning to the exercise of reason.

### WHAT IT MEANS . . .

When the mainstream media does go looking for alternatives to the simple polarity of Neo-Darwinism versus Intelligent Design, it often turns to the Theistic Evolutionists for a more comprehensive view. By holding faith in a mythic, omnipotent God in one hand and a profound belief in scientific rationality in the other, these thinkers are not so much creating a new synthesis as upholding the best in traditional science *and* traditional religion. Many of them are working to reconcile a miracle-making God with the rationalist logic of science. And a few go so far as to use the latest in science, such as complexity, quantum, and string theories, to try to explain biblical miracles. But ultimately, when conflicts arise between the inexplicably miraculous—such as Christ's resurrection—and the purely rational, they bow their heads to a God whose ways we may never be able to fully understand.

#### MAJOR FIGURES

Francis Collins  
 Freeman Dyson  
 Owen Gingerich  
 Kenneth Miller  
 Arthur Peacocke  
 John Polkinghorne  
 Joan Roughgarden  
 Sir John Templeton

#### MAJOR WORKS

*Evolution: The Disguised Friend of Faith?* (Peacocke, 2004)  
*Exploring Reality* (Polkinghorne, 2005)  
*The Language of God* (Collins, 2006)  
*God's Universe* (Gingerich, 2006)

#### INFLUENCES

Alfred Russel Wallace (1823-1913)  
 Theodosius Dobzhansky (1900-1975)  
 Sir John Eccles (1903-1997)

**“Science and religion are two windows that people look through, trying to understand the big universe outside, trying to understand why we are here. The two windows give different views, but they look out at the same universe. Both . . . are worthy of respect.”**

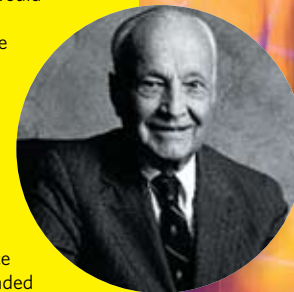
Freeman Dyson



### DID YOU KNOW?

#### The Templeton Influence

If scientific research were to focus on “spiritual realities” rather than on the physical world, would the resulting knowledge catapult humanity forward? This is what Sir John Templeton, the ninety-three-year-old Christian financier and philanthropist, is betting his money on. Believing that good, hard science on the “big questions” of life is the real key to human progress, he has pumped millions into research, creating unprecedented new scholarship on topics such as prayer, altruism, and unconditional love. Chances are that if you’ve read an article about science and spirit lately, it was based on research funded by Sir John.



“Everything on earth is subject to the laws of evolution, and this is particularly true for the human soul.”

Rudolf Steiner



## 9 The Esoteric Evolutionists

### CORE IDEA

Evolution is both a physical and a metaphysical process and it proceeds according to hidden esoteric blueprints that are working themselves out in consciousness and matter.

### WHAT THEY SAY . . .

In 1877, a little-known Russian woman called Madame Blavatsky, founder of Theosophy, published her first book, *Isis Unveiled*, which attacked the reigning scientific consensus on evolution with an unlikely thesis: Consciousness, not matter, is the fundamental component of the cosmos, and physical evolution is only one part of a much larger metaphysical process. Blavatsky's ambitious work, which was quite popular in her day, presented a strange cocktail of ideas—some surprisingly prescient, some downright bizarre—and it helped set the cultural stage for a whole new group of evolutionary thinkers. These Esoteric Evolutionists understood evolution as a process that unfolds according to secret metaphysical laws or blueprints or archetypes hidden in the workings of consciousness itself. Many offered elaborate descriptions of metaphysical realms and saw evolution as ascending through a series of “bodies” (physical, astral, etheric, causal, etc.) or chakras or planes or levels of consciousness. With their detailed metaphysics and their stage-oriented conceptions of evolution, these esoteric thinkers owed much to perennial wisdom, to the Neo-Platonists, and to earlier occult traditions.

Despite their evolutionary bent, many Esoteric Evolutionists, past and present, harken back to the ancient idea of a cyclical cosmos, claiming that whatever is *evolving* in the universe must have already been *involved*, or buried in latent form, in matter. Some have even noted that current ideas in physics regarding multiple universes may provide evidence that even the evolution of the universe might be taking place within a larger cycle of cosmic involution and evolution.

### WHAT IT MEANS . . .

While there are contemporary thinkers who fit within the Esoteric Evolution category, the phrase more appropriately denotes a whole range of ideas that came of age in the first part of the twentieth century, which have been enormously influential in shaping our postmodern spiritual culture. Even the phrase “evolution of consciousness” was, until recently, most widely associated with the Esoteric Evolutionists.

In some respects, these thinkers straddle the line between the modern and the premodern, pioneering a rational understanding of the universe while at the same time often embracing occult, mythical, or scientifically unpopular notions like numerology (Norelli-Bachelet), astrology (Tarnas), or esoteric physics (Airaudi). In contrast to other modern schools of evolutionary thought, their metaphysics tends to be more extensive, their research based more on esoteric insight than empirical investigation, and their view of the future more predetermined. This goes against the grain of recent conceptions of evolution, from Whitehead to Wilber, which place an emphasis on contingency and creativity, allowing more room for surprise and novelty in the evolutionary process.

### MAJOR FIGURES

Oberto Airaudi  
Patrizia Norelli-Bachelet  
Richard Tarnas  
Colin Wilson

### MAJOR WORKS

*The Secret Doctrine* (Blavatsky, 1888)  
*Outline of Occult Science* (Steiner, 1909)  
*The Occult* (Wilson, 1973)  
*Cosmos and Psyche* (Tarnas, 2006)

### INFLUENCES

Sri Aurobindo (1872-1950)  
Alice Bailey (1880-1949)  
Madame Blavatsky (1831-1891)  
Richard Bucke (1837-1902)  
Jean Gebser (1905-1973)  
Carl Jung (1875-1961)  
The Mother (1878-1973)  
P.D. Ouspensky (1878-1947)  
Rudolf Steiner (1861-1925)

# 10 The Process Philosophers

## CORE IDEA

God is not a static creator outside time and space but the dynamic, creative dimension of the evolutionary process *in* time and space.

## WHAT THEY SAY . . .

The Process Philosophers view the universe from a perspective we might call “top down.” Following in the footsteps of the great English mathematician and philosopher Alfred North Whitehead, they reject the scientific impulse to reduce all of nature to its most basic material components, instead looking to integrate science and spirit into a whole new understanding of God—and a whole new understanding of evolution.

“[Whitehead] said that if you want to know the general principles of existence,” writes integral philosopher Ken Wilber, one of his growing number of contemporary fans, “you must start at the top and use the highest occasions\* to illumine the lowest, not the other way around.” For Whitehead, the highest occasion of all was God, and God could best be understood as an active principle within the manifest universe—a principle he famously called “the creative advance into novelty.” This fundamental cosmic urge toward *newness*, he said, was profoundly entwined with the processes of evolution, at all times calling the events of the world forward into ever-greater beauty, variety, and complexity.

But Process Philosophy’s emphasis on novelty and divinity doesn’t mean that it is at odds with science; rather, these innovative thinkers see God’s influence “not as a violation of the world’s normal causal processes,” theologian David Ray Griffin explains, “but as one of its regular dimensions.” They maintain that the course of evolution is still shaped by ordinary cause and effect while at the same time always infused with the promise of fresh possibilities and always, at all levels, subject to at least some measure of free will.

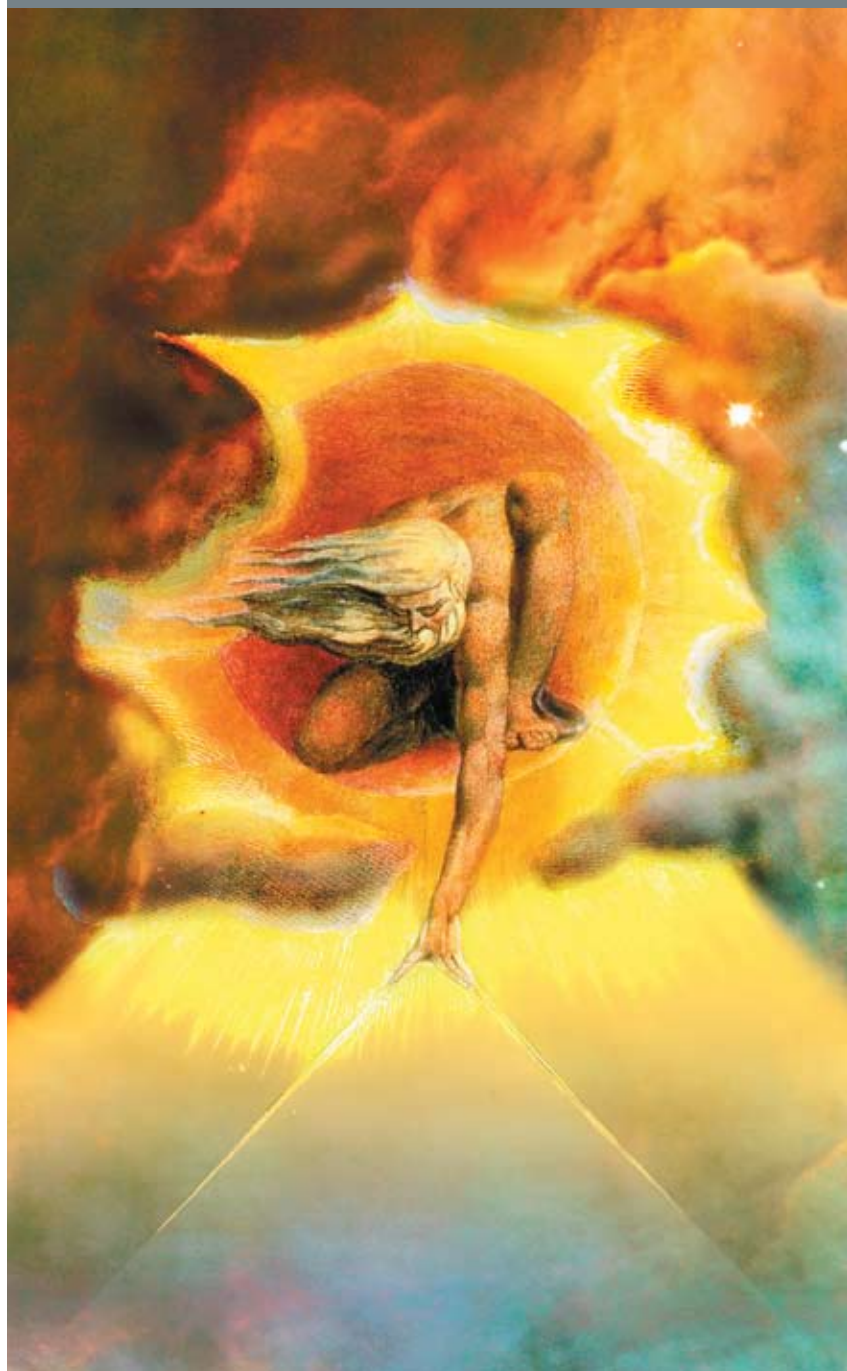
\*In Whitehead’s system, the fundamental elements of reality are called “actual occasions,” discrete moments of experience that are always in the process of becoming.

## WHAT IT MEANS . . .

By bringing God down from heaven’s unchanging skies and thrusting him smack into the middle of the creative universe, the Process Philosophers have redefined the relationship between nature and the Divine, sparking a sea change in twentieth-century philosophy and theology. Although you won’t hear about them in the popular press, their influence is steadily growing among a whole range of thinkers who are now gathering science and religion together under the same banner in the quest to develop new, more integrated theories of evolution. Process thought is sometimes compared to Buddhist teachings on flux and change, but by adopting a Western evolutionary perspective as its underlying framework, it transcends the premodern religious paradigm that holds our universe to be both physically and spiritually static. Profoundly rational and deeply satisfying to the post-traditional mind, it forms an important groundwork for a new twenty-first-century evolutionary theology.

“There is no God without a world, just as there is no world without God. We cannot think of a beginning of either.”

John Cobb



### MAJOR FIGURES

Charles Birch  
John Cobb  
Roland Faber  
David Ray Griffin  
William E. Kaufman  
Nicholas Rescher  
Marjorie Hewitt Suchocki

### MAJOR WORKS

*Process and Reality* (Whitehead 1929)  
*The Liberation of Life* (Birch and Cobb, 1981)  
*Omnipotence and Other Theological Mistakes* (Hartshorne, 1984)  
*Religion and Science* (Ian Barbour, 1997)  
*Religion and Scientific Naturalism* (Griffin, 2000)

### INFLUENCES

Charles Sanders Peirce (1839–1914)  
William James (1842–1910)  
Samuel Alexander (1859–1938)  
Henri Bergson (1859–1941)  
Alfred North Whitehead (1861–1947)  
Charles Hartshorne (1897–2000)

“God’s ecstasy creates the world, and the world’s ecstasy realizes God. And you are right in the midst of it all.”

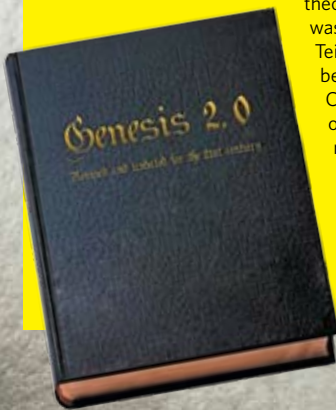
Beatrice Bruteau



## DID YOU KNOW?

### The Great Story

The Great Story idea, which embraces the grand epic of the evolving cosmos as a post-traditional creation myth for our time, is a more ecologically oriented offshoot of Teilhard’s transcendent teleological vision. Inspired by environmentalist theologian Thomas Berry, who was deeply influenced by Teilhard but criticized him for being too anthropocentric, too Christian-centric, and overly optimistic about progress, this new religious movement is currently gathering steam behind thinkers like Brian Swimme, Mary Evelyn Tucker, Michael Dowd, and Connie Barlow.



# 11 The Conscious Evolutionists

## CORE IDEA

We live in an unfinished cosmos, and its further development depends on *us* and our willingness to actively participate in the evolution of consciousness.

## WHAT THEY SAY . . .

The Conscious Evolutionists share much in common with the Integralists and the Process Philosophers, but they show particular allegiance to the guiding spirit of one of the twentieth century’s most extraordinary muses: the Jesuit paleontologist-theologian Pierre Teilhard de Chardin. Teilhard saw the evolution of the cosmos as one interwoven psycho-physical-spiritual process, and he described the fundamental law of that process as the law of complexity-consciousness. All things, he said, from the lowliest pre-atomic particle to the loftiest human being, are possessed of both exterior and interior dimensions that evolve in concert; as matter complexifies, consciousness deepens. As cosmologist Brian Swimme explains it, this law defines the vast deep-time trajectory of a universe that “begins with matter, develops into life, develops into thought, develops into God.”

Since the creative edge of evolution is now unfolding through ever-more integrated realms of mind and consciousness, these spiritual futurists believe, the evolutionary process has become a cocreative act, and its continuation depends on our awakening to the unique cosmic role and responsibility that comes with the gift of self-awareness. In other words, the frontiers of evolutionary development are no longer happening in the vast reaches of space or the fiery cauldrons of the stars but in and between *us*, in human consciousness and culture.

## WHAT IT MEANS . . .

From Al Gore to Mario Cuomo to Christian de Duve to Marshall McLuhan, Teilhard de Chardin inspired an entire generation to take up the mantle of conscious evolution in a variety of different ways. Much has been made, in particular, of his concept of the *noosphere*—a sort of emergent planetary mind made up of the entire sphere of human thought, culture, and technology—as (among other things) a surprisingly prescient vision of the internet.

Now, thanks to people like author and futurist Barbara Marx Hubbard, “conscious evolution” is becoming one of the spiritual watchwords of our time—not always carrying Teilhard’s mystical depth, but always pointing toward a more integrated scientific and spiritual embrace of evolution itself as “a light illuminating all facts, a curve that all lines must follow,” to borrow Teilhard’s own famous phrase. Less focused than Aurobindo and the Integralists on individual transformation, and less oriented by the Eastern notion of enlightenment than by the Christian ideals of redemption and community, the Conscious Evolutionists’ emphasis is on humanity’s evolutionary future and its march toward a greater collective awakening.

## MAJOR FIGURES

Thomas Berry  
Beatrice Bruteau  
Michael Dowd  
John Haught  
Barbara Marx Hubbard  
Ursula King  
Brian Swimme  
Mary Evelyn Tucker

## MAJOR WORKS

*Creative Evolution* (Bergson, 1907)  
*The Human Phenomenon* (Teilhard, 1955)  
*The Dream of the Earth* (Berry, 1988)  
*The Universe Story* (Berry & Swimme, 1992)  
*God’s Ecstasy* (Bruteau, 1997)  
*Conscious Evolution* (Hubbard, 1998)  
*God After Darwin* (Haught, 2000)

## INFLUENCES

Ralph Waldo Emerson (1803–1882)  
Henri Bergson (1859–1941)  
Alfred North Whitehead (1861–1947)  
Sri Aurobindo (1872–1950)  
Pierre Teilhard de Chardin (1881–1955)  
Julian Huxley (1887–1975)



# 12 The Integralists

## CORE IDEA

Evolution is a holistic process that includes both objective and subjective dimensions of reality as it moves toward greater exterior complexity of form and greater interior depth of consciousness.

## WHAT THEY SAY . . .

The term “integral” is becoming more and more ubiquitous these days, but its origins go back to the early twentieth century. During that time, three different individuals began using the term in relation to the nature and direction of human evolution: Indian sage Sri Aurobindo, German philosopher Jean Gebser, and Harvard sociologist Pitirim Sorokin.

“Integral” was intended to represent a unifying perspective that would incorporate various partial views of reality into a holistic conception of human knowledge. In this respect, the Integralists’ goal is not so much a new theory of evolution but a larger perspective that can effectively integrate disparate existing theories, both spiritual and scientific, into a coherent picture of the entire evolutionary process. More than synthesizers, they offer a sort of radically inclusive meta-theory, one that sees truth everywhere—from the gene-centered focus of the Neo-Darwinists to the mathematical insights of the Complexity Theorists to the creativity of the Process Philosophers—but attempts to provide a larger context that allows us to see the relationships between these many evolutionary perspectives.

Some Integralists follow the lead of Gebser and focus their work more explicitly on the evolution of culture, while others lean more toward the work of Aurobindo who integrated the concept of individual enlightenment into his evolutionary schema. Some have followed Ken Wilber’s lead in trying to integrate both psychological stages of development and mystical states of consciousness into their theoretical frameworks with the idea, as Allan Combs explains it, that “individual development anticipates the evolutionary future of the entire human species.”

## WHAT IT MEANS . . .

Contemporary Integralists owe a great debt to the towering work of Ken Wilber, who has almost single-handedly revived the term integral and has helped make evolution a fundamental context for the way in which we think not just about physics and biology but about all of human life and culture.

Like the Conscious Evolutionists and the Process Philosophers, the Integralists are reaching for a higher synthesis and a deeper integration between science and spirit. In this relatively new field, there is a great deal of overlap with other evolutionary currents of thought, and what exactly “integral” even means is a matter of debate. But there is a great need in the contemporary evolution dialogue for higher perspectives that can sift through the competing cacophony of voices and theories, highlighting the knowledge that is enhancing our understanding of evolution and bringing context and clarity to the discussion. The Integralists show enormous potential for playing that role—diffusing some of the heat from today’s culture wars while providing a good deal more light.

### MAJOR FIGURES

Don Beck  
Allan Combs  
Robert Godwin  
Sally Goerner  
George Leonard  
Michael Murphy  
William Irwin Thompson  
Ken Wilber

### MAJOR WORKS

*The Life Divine* (Aurobindo, 1949)  
*The Ever-Present Origin* (Gebser, c. 1950)  
*Sex, Ecology, Spirituality* (Wilber, 1995)  
*Self and Society* (Thompson, 2004)  
*The Radiance of Being* (Combs, 1995)

### INFLUENCES

Georg Hegel (1770–1831)  
Friedrich Schelling (1775–1854)  
Henri Bergson (1859–1941)  
James Mark Baldwin (1861–1934)  
Alfred North Whitehead (1861–1947)  
Sri Aurobindo (1872–1950)  
Pierre Teilhard de Chardin (1881–1955)  
Jean Gebser (1905–1973)  
Clare Graves (1914–1986)

“Evolution goes beyond what went before, but because it must embrace what went before, then its very nature is to transcend and include, and thus it has an inherent directionality, a secret impulse, toward increasing depth, increasing intrinsic value, increasing consciousness.”

Ken Wilber

