

C H A P T E R

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God and a New Biology

THE OVERVIEW

*D*arwin's theory of evolution is the foundation of biology, but every modern biologist—in moments of total honesty—hears the foundation creaking. Darwinism is a theory of continuous evolution. But it's now an open secret that fossil gaps—discontinuities in evolutionary fossil lineages—pose a serious threat to the complete validity of Darwin's theory. It is also well known that Darwin's theory and God's existence are mutually exclusive ideas. But if Darwin's theory is at best an incomplete theory of evolution, only able to explain its continuous epochs, there's room for God to make a comeback.

Intelligent design theories try to revive God, either explicitly, as in creationism, or implicitly, by pointing to the intelligence and leaving us to infer a designer, but end by denying evolution altogether. What an ingenious way to sidestep the fossil gaps: no evolution, no fossil gaps to explain. Unfortunately, too much credible

evidence exists in favor of our evolutionary ancestry for this dodge to work.

But should we throw the baby out with the bath water? Is there any substance in intelligent design theory (let alone creationism) that warrants serious scientific attention? Do these theories present any ideas with which biologists must come to terms? The unprejudiced scientific answer to both questions is yes. And the important idea I am talking about is this: An intelligent design of life suggests that biology must come to terms with the feeling, meaning, and purposiveness of life and with the idea of a designer.

The current materialist basis of biological theories, including Darwinism (and its more recent revision, neo-Darwinism), prevents these theories from properly including these theologically tinged ideas. In this book I demonstrate that including the idea of creativity in biological evolution reconciles the notions of evolution with those of intelligent design by a purposive designer. In fact, I show that evolution proves intelligent design. Furthermore, when the question of the purposiveness of life's design and the existence of the designer are reconciled with the evolutionary ideas of Darwinism by using quantum physics and the primacy of consciousness, many other paradigmatic difficulties of biology and biological evolution are also resolved.

Although intelligent design theorists miss it, one piece of compelling experimental evidence exists for design and purposiveness of life: The evolution of life proceeds from simplicity to complexity. By looking at the fossil data alone, any intelligent person can distinguish between time past and time future. In other words, the fossil record of biological evolution gives us an unmistakable arrow of time. The intelligent design theorists miss the importance of this fact because of their contention that there is no evolution at all.

Darwinists, on the other hand, do attempt to understand the evolutionary trend to develop complexity and intelligence. But their attempts are based on the idea of genetic determinism—that

evolution is determined and driven by genes' need to survive (Dawkins 1976). This idea enables biologists to attribute all sure signs of the intelligence of life—feeling, meaning, and indeed consciousness itself, just to name a few—to adaptive epiphenomena of the genetic drive to survive environmental changes. The notion is very weak on two scores. First, compelling theoretical arguments have been presented showing that the molecules of which genes are part do not have the capacity to process feeling, meaning, or consciousness. How then can such qualities evolve adaptively from nothing? Second, most biologists believe that biology at its most basic is connected to physics, but in recent years physics itself, under the pressure of compelling experimental data, has abandoned strict determinism and made room for occasional conscious choice. Despite this ideological change, physics has escaped major revision because it concerns itself with behavior en masse: It rests on a statistical determinism that holds for a large number of objects or a large number of events, or both. The biologist has no such consolation, because in biology the behavior of a single organism is as much a concern as that of the many.

In short, biology must reconcile itself with the revolutionary aspect of quantum physics: that is, indeterminacy and choice by a quantum consciousness. I show in this book that such a reformulation of biology puts the idea of creative evolution on a firm footing. With such a footing, a theory of creative evolution can not only integrate such disparate ideas as intelligent design and evolutionism or discontinuity and continuity, but also unify ideas of development (how biological form arises from a one-celled zygote) with ideas of evolution.

The sympathy that a portion of the American public feels for intelligent design theory is not merely of religious origin. It can also be traced to an uneasiness about the attitudes implicit in Darwinian evolutionism, and indeed in scientific materialism itself. How can we take these viewpoints seriously when they denigrate our intelligence, our capacity to process feeling and meaning, and

our consciousness itself by naming them a meaningless, epiphenomenal dance of elementary particles and their conglomerates, the genes? We are also uneasy because Darwinism tells us nothing significant about the future of our evolution. Does evolution lead to increased intelligence? Darwinism is equivocal: Evolution can lead to more complex or less complex organisms, more intelligence or less. We cannot predict; the outcome is left to chance and survival necessity.

The theory developed in this book, creative evolution, is unequivocal. Creative evolution is geared toward higher and higher intelligence, toward developing qualities of intelligence that our religions and spiritual traditions identify as godly. If you hear in that statement the echo of the ideas of such philosophers as Sri Aurobindo and Pierre Teilhard de Chardin, that is no coincidence. Creative evolution incorporates the revolutionary ideas of these two great thinkers.

In addition to making room for such ideas, the inclusiveness of creative evolution permits resolution of several long-standing sore points in biology. For example, the ideas of Lamarckism—that traits acquired in an individual lifetime can be inherited by offspring—are reintegrated into biology, ending a long controversy. This reconciliation is accomplished in the context of a much-needed explanation of instincts. The new biology proposed here incorporates a proper resolution of the mind-brain problem: Specifically, it presents a paradox-free treatment of the neurophysiology of perception. Most importantly, an integrative reformulation that locates biology within consciousness enables us to arrive at a proper formulation of biology that includes feeling and that can begin to treat heterogeneity, the individual differences between organisms. Furthermore, locating the new biology within consciousness leads to a satisfying bioethics and a deep ecology. It also gives us a new perspective for dealing with the issue of survival after death, a perspective that opens the door for additional reconciliation of biology and religion.

Apropos of religion, a word about the title of this chapter, which links God and biology. I freely use the terms *God* and *quantum consciousness*—the causal source of conscious choice in quantum physics—as interchangeable concepts, an equivalence I explore further in chapter 2. This choice to use the term *God*, made as a gesture toward the viewpoint of the faithful believer, should not be taken as an affront to the scientific sensitivity of the professional biologist. As you will see, the God of this book is an objective organizing principle. Seen as a new, objective organizing principle, the idea of God becomes useful under the most stringent qualifications as an element of new science.

SO WHERE'S THE PROBLEM?

Many people dismiss the idea of intelligent design offhand because “everybody knows” that Darwin and his followers have shown evolution rules out intelligent design and a designer. It is true that Darwin’s theory attempted to explain evolution without invoking the concept of intelligent design. However, it is also true that, according to Darwin’s theory, evolution is continuous and should produce a continuous fossil record of all evolution. Unfortunately, the fossil records show glaring gaps at many important junctures. In other words, evolution is not only continuous but also discontinuous (Eldredge and Gould 1972). Evolution has been compared to punctuated prose: The punctuation marks are discontinuities in otherwise continuous text. Darwinism cannot provide a fully credible explanation of such discontinuity. In this book, I take the discontinuity in biological evolution seriously and show that, like the well-known discontinuous jumps of our own creative experiences (Harman and Reingold 1984), the fossil gaps are signatures of biological creativity. And creativity is a definitive sign of intelligence. In this way, I show that evolution proves intelligent design.

However, creativity and intelligent design also imply a creative and intelligent designer, or, as I term it, a nonphysical and nonmaterial organizing principle. Such organizing principles have been proposed in biology from time to time, but until now it has not been clear how this kind of organizing principle could operate within a scientific framework. In this book I will show that some recent developments in quantum physics and elsewhere are telling us how much-needed nonphysical and nonmaterial organizing principles can be incorporated in biology.

Every biologist must be painfully aware that biology is an incomplete science. It needs new organizing principles, ones that are nonphysical and nonmaterial, to explain three perennial mysteries: the difference between life and nonlife (Davies 1988), the development of an embryo into an adult biological form (Sheldrake 1981), and, as emphasized here and by Eldredge and Gould (1972), the discontinuous epochs of evolution. Unfortunately, it is not politically correct for a biologist to admit these shortcomings in public. In this book, I will show that the introduction of new nonphysical and nonmaterial organizing principles (yes, principles, plural; we need more than one) can complete biology as a science. In this way I will set a framework from which biologists can work to rid their field of the paradoxes, controversies, and anomalies that have plagued it from its very inception to the present, including the highly politicized controversy pitting evolutionism against creationism and theories of intelligent design.

THE ORGANIZING PRINCIPLES OF OLD BIOLOGY

The current biological paradigm (the “old” paradigm) is based on two organizing principles. One is the principle of *upward causation*: All biological phenomena arise from the interaction of

microscopic constituents of matter called *molecules* (and ultimately from the interactions of submicroscopic particles called *elementary particles*). This principle assumes a molecular basis of life, the idea that life can be reduced to the movement of molecules. This assumption has given us molecular biology—a science proclaiming that all the functions of a living cell and conglomerates of cells can be understood in terms of the physics and chemistry of molecules, especially large “macromolecules” called *proteins*, *DNA* (deoxyribonucleic acid molecules), and *genes* (portions of DNA). In biology, the dogma of upward causation is expressed as genetic determinism: Genes determine all biological form and function.

The other organizing principle of old biology is that *evolution is determined by chance and necessity*. This principle, discovered by Charles Darwin in 1857 (Darwin 1859), forms the basis of the evolutionary model called *Darwinism* (see Mayr 1982 for a history) that is accepted, explicitly or implicitly, by most biologists. According to the latest version of Darwinism, evolution proceeds in two stages. The first stage is the chance production of variations in the hereditary components of life (the above-mentioned genes). The second stage is selection from among these variations, dictated by the necessities of survival for species coping with changes in the natural environment. This process is called *natural selection*. The genetic changes that cause the beneficial chance variations occur rarely, but working over millions of years this slow, two-step Darwinian mechanism accounts for all facets of evolution, according to most biologists.

However, both of these organizing principles are mired in controversy. A debate continues about whether molecular biology can ever explain what life is or how it originated. After some initial successes, the molecular synthesis of life in the laboratory has remained elusive (Davies 1999). Controversy also swirls around theories of development, that is, how a single-cell zygote develops into a full-fledged form, the organism. Is organismic development

solely the handiwork of upward causation from the genes, or is there a role for the environment (Goodwin 1994)? Might there even be a role for new organizing principles in explaining the full intricacies of development (Sheldrake 1981)?

Perhaps it was such controversies that prompted this remark by the biologist Brian Goodwin (1994): “I don’t think biology at the moment is a science at all, at least in the sense that physics and chemistry are sciences. We need to know the universal ordering principles just as Newton provided them for the inanimate world.”

The most publicly visible controversy is, of course, about evolution. The main scientific evidence for biological evolution is the fossil data. According to Darwinism, the story of evolution is a continuous one: The transition from an earlier species to a later one is incremental and continuous, and the fossil data should reflect that. Unfortunately, this premise is not borne out; we find the famous fossil gaps already mentioned, gaps that appear when the fossil data are viewed as a chronology of evolutionary ancestry. Darwin himself knew about this problem, but he was optimistic, justifiably, that further investigation would turn up intermediates to fill the gaps. Indeed, we do occasionally hear about discoveries of intermediates, but according to Darwin’s theory, thousands upon thousands of these intermediates should have been discovered by now. Such discoveries have not happened. So the fossil gaps raise legitimate doubts about the veracity of Darwinism (and its later incarnation, neo-Darwinism) as a complete theory of evolution. In science, we must take data seriously, and by now much research should have been carried out toward replacing Darwinism. But this has not happened either; the challenge to Darwinism (and neo-Darwinism) within biology has been sporadic, and even these sporadic efforts have, to a large extent, been ignored (see chapter 10 for a bit of history). Because biologists in the main have been less than candid about this matter, the challenge to Darwinism was taken up outside the scientific arena and has become highly politicized.

WHAT IS INTELLIGENT DESIGN?

In the public arena, the challengers who have gotten the most visible support are those who challenge the idea of evolution itself. Suppose there is no evolution; it is a fact that the fossil data indicate much stasis; many organisms seem not to change for long periods of geological time. The challengers posit the following: Suppose that, instead of being the result of evolution, all life is the result of intelligent design by a designer who acts all at once. Certain biological forms are too complex to have originated through chance and necessity, these challengers maintain.

Some intelligent design theorists resort to an old philosophy called *creationism*, following the Genesis chapter of the Old Testament of the Bible (Gish 1978). This theory flatly declares that God created the world and all the biological species six thousand years ago in six days: There is no evolution.

The idea of creation by God is an aspect of God's *downward causation*. The term reflects the tendency to picture God as an emperor sitting on a throne "up there" in the heavens, brandishing the causal wand of downward creation in His hand. Such anthropomorphic pictures of God irritate scientists (and probably many nonscientists as well).

The resurgence of creationism as an alternative to evolutionism has increased the stakes, because the context of the controversy has reverted to the old struggle for "worldview control" between science and the Christian church, and so a lot of negative emotion has been generated. Scientists feel invaded by theology: How can it be called science when an idea of faith (the biblical God) is brought to bear on science? On the face of it, creationism does sound unscientific, even to an unprejudiced reader, because of its biblical origin; it is true that the validity of the Bible is based on faith, not experimental data.

Can religion be taken out of this debate? More recently, some serious scientists, among them some professional biologists, have

begun posing the idea that species are created by an intelligent designer—maybe God, but it is kept implicit—without subscribing to the biblical baggage. In scientific language, this “causal creation by the intelligent designer” is just another organizing principle, albeit a nonphysical and nonmaterial one.

Any perceptive person can see design in life. Can that intelligent design come from linear, step-by-incremental-step chance and necessity? In spite of all the time available for chance and necessity to do their thing, detailed reasoning and probability calculations by the intelligent design theorists and their sympathizers (Shapiro 1986; Behe 1996) raise legitimate doubts about the validity of Darwinism as a mechanism for producing the complicated, often nonlinear designs that life exhibits. These doubts certainly justify scientific consideration of alternatives to Darwinism. If such an alternative involves the introduction of additional organizing principles in biology, so be it.

A CLASH OF WORLDVIEWS

In 2005, the Kansas state board of education got a lot of attention in the media because they adopted a school curriculum that favors the teaching of intelligent design along with evolutionism. Two national science organizations, the National Academy of Sciences and the National Science Teachers Association, started blackballing the state of Kansas by refusing to allow it the use of key science education material. In official statements, the organizations said they were disappointed that the Kansas board deleted a paragraph in an earlier draft of the education standards in which science was defined as “a search for natural explanation of observable phenomena.” Sounds fair, doesn’t it? But in an interview Jay Labov, a senior advisor for education at the National Academy of Sciences, gave away the real concern, which was that “the deletion

could lead students to believe that supernatural explanations also may fall within the purview of science” (Weiss 2005).

These scientific organizations are implicitly defining nature as consisting of the material universe. Any organizing principle that is nonmaterial is automatically excluded from science by definition.

However, mainstream scientists themselves, biologists included, have a fundamental but unproven metaphysical assumption behind their work called *scientific materialism*. This philosophy posits that when everything is said and done, all things and phenomena of the world can be understood on the basis of only one causal substratum—the elementary particles, the basic building blocks that make up matter. Can one unproven metaphysical assumption be allowed to exclude other metaphysical assumptions in science? Isn’t that akin to the very faith that scientists complain about when they criticize creationism and intelligent design theories?

You will often hear mainstream scientists declare that, in this technological age, the validity of scientific materialism should be obvious and that it is “absurd” to speak of nonmaterial organizing principles. That way lies dualism, the idea that two separate and irreducible principles (in this case, material and nonmaterial reality) can coexist. Such scientists point to the perennial logical challenge to dualism: Two entirely different substances with nothing in common cannot interact, cannot impose causation upon one another. How does a nonmaterial designer interact with matter to design something? Is there a mediator of their interaction? If not, how can they possibly interact?

For contrast, let’s look at the causal picture of upward causation that is supported by most scientists. Elementary particles make atoms, atoms make molecules, molecules make living cells with those all-powerful genes, some of the living cells (guided by the genes) make the brain, and the brain makes all subjective experiences, such as consciousness, thoughts, feelings, and so on. Cause rises upward from the elementary particles, and all causation is upward causation.

Dualism is scientifically absurd, but is this picture of the design—humankind as the product of upward causation—any less absurd? Can you really believe that all your thoughts and meanings, your feelings and struggles with values, and indeed your consciousness itself, are the results of a random dance of elementary particles or genetic determinism? That you are a purely ornamental epiphenomenon, a secondary consequence of the random movement of the matter in your brain cells? Even the scientific proponents of the idea of purely upward causation don't really believe that! If they themselves are merely causally impotent epiphenomena, why do they take themselves and their ideas so seriously?

We see that the great evolution debate between science and Christianity is really a clash between two worldviews, both of which are faulty. Is there a way out of this dilemma?

WHAT DO THE DATA SAY?

In science, experimental results are the final arbiter; if data falsify the predictions of a theory, we must give up the theory, or at least suitably modify its scope. So let us look at data.

Biologists claim that creationism does not stack up well against that ultimate scientific test. This claim is correct. In creationist theory, God created the world six thousand years ago in just six days. This statement has been falsified beyond doubt; much geological and even physical data (radioactive dating) exist to show convincingly that the Earth is about five billion years old.

But the creationists make an equally valid claim that Darwin's theory of evolution is falsified because of the fossil gaps. One of Darwin's major theoretical predictions was that gaps would eventually fill up as we perfect our empirical investigations; many later biologists have expressed similar optimism. Well, we have perfected the techniques of empirical investigation, and just

as the age of the Earth can today be stated accurately, so can one state accurately that the fossil gaps are mostly real: They're here to stay.

To be sure, a few intermediates have caused a stir. For example, in reports of intermediates by the biologist J. G. M. Thewissen and his collaborators (1994), much is made of an intermediate fossil found for an animal that could move both in land and in water, a land-walking whale, so to speak. But how many such cases exist today? A thorough search of the Internet yields only about fifty cases of intermediates in the entire fish-amphibian-reptilian lineage of about forty-two thousand species.

The discovery of intermediates is important because it discredits creationism in favor of evolutionism; unfortunately, evolutionism is not the same thing as Darwinism. I repeat: According to theoretical predictions of Darwinism and its later versions, there should have been thousands upon thousands of reported cases of intermediates filling up most of the fossil gaps. That hasn't happened, and therefore the question of the fossil gaps cannot be refuted simply because a few cases of transitional fossils have been found.

Because both creationism and Darwinism are based on faulty philosophy and both are falsified in part by the data, should we give them up entirely? No, there is a middle ground.

In spite of the fossil gaps, evolutionism does have a solid empirical fact on its side: Some species have so much in common that the idea of a common origin, a tree of life, so to speak, seems unavoidably obvious. Darwin's original idea about such similarities (called *homology*) has now been corroborated with very convincing data (Carroll 2005). Such a tree has gaps in it, to be sure (fig. 1), reflecting the fossil gaps. But the idea that species evolve from ancestors is too consistent with the data to give up in favor of the alternative, as presented by creationism and intelligent design theory, that God created all species all at once, independently of one another.