IS EVOLUTION A FACT?

During the summer of 2009 I was invited to participate in a written, online debate on the topic of organic evolution. One disputant, an evolutionist, had agreed to affirm the following proposition:

> **RESOLVED**: Macroevolution (as suggested by the General Theory of Evolution—as opposed to microevolution, as suggested by the Special Theory of Evolution) **is** a fact, and as such, represents a correct scientific explanation of the origin of the Universe and life on Earth.

I agreed to respond in the negative to the evolutionist's written arguments. Once that had been accomplished, a reverse process would ensue. As a non-evolutionist, I would affirm the following proposition:

> **RESOLVED**: Macroevolution (as suggested by the General Theory of Evolution—as opposed to microevolution, as suggested by the Special Theory of Evolution) is **not** a fact, and as such, does not represent a correct scientific explanation of the origin of the Universe and life on Earth.

Having produced a rebuttal to the evidences that my opponent suggested as proof for macroevolution, I now would like to offer my affirmative argument, per the proposition above.

NON-EVOLUTIONIST'S FIRST AFFIRMATIVE: EVOLUTION IS NOT A "FACT"

One of the perennial bones of contention in the evolution controversy has long centered on whether or not evolution can properly be referred to as a "fact" instead of a theory. This particular element of the controversy reached somewhat of a crescendo several years back when John Rennie, editor of *Scientific American*, authored an rather caustic article for the July 2002 issue of that journal titled "15 Answers to Creationist Nonsense." In his comments, Mr. Rennie argued that while "laypeople" may use the term "theory" as something that falls "in the middle of a hierarchy of certainty—above a mere hypothesis but below a law," the truth is that "scientists do not use the terms that way" (2002, 287[1]:79).

Many of us who have been trained in science, work in science, or teach science, were as astonished as we were perplexed upon reading Rennie's comments—because they certainly do not represent what we were taught regarding the scientific method, and because they definitely do not represent what we teach our students concerning how the scientific method works. Whether a person examines a science text of the past or the present (e.g., a basic biology book), the instruction within that book regarding the process concerning how the scientific method works will very likely be quite straightforward, and probably will present a progression that looks something like this:

Observation
Statement and Definition of Problem
Formation of Hypothesis
Deduction from Hypothesis of Prediction
Experimentation
Formation of Theory or Law

I will not consume valuable space here providing references from the literature to document each step in the above process, since that progression is discussed in the first chapter of most elementary science books in an attempt to: (a) teach students what science is and how it works; and (b) give students an overview of the correct procedures involved in the scientific method.

Scientists, and philosophers of science (not just "laypeople"), have long taught their students that a **theory** is a broadly based, widely accepted hypothesis intended to explain something that has been observed, and that is supported by at least some experimental evidence. A scientific **law**, on the other hand, is "viewed as reflecting actual regularities in nature" (Hull, 1974, p. 3). There are no known exceptions to scientific laws (e.g.: biogenesis, causality, thermodynamics, etc.)—else, obviously, they would not be laws, but theories.

These days, however, what once was considered to be "the standard textbook definition of a theory" apparently no longer pays sufficient homage to the concept of organic evolution. Thus, attempts are under way (and have been under way for quite some time, as you will see as you continue reading) to "restructure" the words "theory" and "fact" so as to move the concept of evolution from the former to the latter. Evolutionists realize the importance (as they see it) of successfully changing the status of evolution from " 'just' a theory" to that of a **fact** in order to make it more appealing (palatable?) to the general populace. They therefore are willing to expend great time, effort, and expense to convince people to stop speaking of the "theory" of evolution, and to speak instead of the "fact" of evolution.

But in order to accomplish this, they must redefine certain words like "theory" and "fact." And redefine they have! John Rennie hardly was the first to attempt such a redefinition. As long ago as 1965, George Gaylord Simpson and W.S. Beck boldly attempted such a redefinition in their biology text, *Life: An Introduction to Biology*, in which they ended their "redefining" section by claiming,

> "Theories may be just as certain—merit just as much confidence—as what are popularly called 'facts.' Belief that the sun will rise tomorrow is the confident application of a generalization. The theory that life has evolved is founded on much more evidence than supports the generalization that the sun rises every day. In the vernacular, we are justified in calling both 'facts' " (1965, p. 16).

Twenty-two years later, in the January 1987 issue of the popular-science magazine *Discover*, the late Stephen J. Gould of Harvard authored a lengthy article titled "Darwinism Defined: The Difference Between Fact and Theory." In that article, Dr. Gould expressed his extreme agitation at the inability of certain people (who should know better, he said) to properly address evolution by its rightful designation—as a **fact**, not a theory. The specific cause (that particular time) for Gould's discomfiture was an article (by syndicated columnist Irving Kristol) that had appeared in the September 30, 1986, issue of the *New York Times*. Dr. Gould acknowledged both his dismay and dissatisfaction at the apparent inability of people like Mr. Kristol to distinguish (to use Gould's words) "the central distinction between secure fact and healthy debate about theory" (1987a, 8[1]:64). Dr. Gould then explained what he meant when he went on note:

> "Facts are the world's data; theories are explanations proposed to interpret and coordinate facts. The fact of evolution is as well established as anything in science (as secure as the revolution of the earth about the sun), though absolute certainty has no place in our lexicon. Theories, or statements about the causes of documented evolutionary change, are now in a period of intense debate—a good mark of science in its healthiest state. Facts don't disappear while scientists debate theories" (p. 64, parenthetical comment in orig.).

Later in that same article Gould wrote that "...evolution is also a fact of nature, and so do we teach it as well, just as our geological colleagues describe the structure of silicate minerals, and astronomers the elliptical orbits of the planets" (p. 65).

What could be clearer? Dr. Gould wanted everyone to know that evolution is a fact. **How** evolution occurred may be considered by some to be "merely a theory," but **that** evolution has occurred is a fact not open for further discussion. Gould even commented, "I don't want to sound like a shrill dogmatist shouting 'rally 'round the flag boys,' but biologists have reached a consensus...about the **fact** of evolution" (p. 69, emp. added).

Before proceeding, I would like to address Dr. Gould's comment that "biologists have reached **a consensus** about the fact of evolution." Unfortunately, this faulty form of argumentation is sprinkled liberally throughout much writing about evolution. One philosopher of science, Paul Ricci, wrote in his book, *Fundamentals of Critical Thinking*, that "the reliability of evolution not only as a theory but as a principle of understanding is not contested by **the vast majority** of biologists, geologists, astronomers, and other scientists" (1986, p. 172, emp. added).

However, arguments based on "counting heads" are fallacious. In fact, logic professors routinely instruct their students on various fallacies of human thought, one of which is known as the "fallacy of consensus." Interestingly, three pages after Mr. Ricci made the statement mentioned above, he actually cov-

ered the fallacy of consensus in his book, and explained quite adequately its erroneous nature (p. 175). Yet for some reason that did not keep him from falling victim to the very fallacy about which he tried to warn his student readers: **truth is not determined by popular opinion or majority vote**. A thing may be, and often is, true even when accepted only by a small minority. The history of science is replete with such examples. British medical doctor, Edward Jenner (1749-1823), was scorned when he suggested that he had produced a smallpox vaccine by infecting people with a less-virulent strain of the disease-causing organism. Afterwards, he lived as a man whose reputation had been sullied. Yet his vaccine helped the World Health Organization eradicate smallpox. Physician Ignaz Semmelweis (1818-1865) of Austria is another interesting case study. He noticed the high mortality rate among surgical patients, and suggested that the deaths resulted from surgeons washing neither their hands nor their instruments between patients. Dr. Semmelweis asked them to do so, but they ridiculed him. Today, the solutions posed by this gentle doctor are the basis of antiseptic techniques in life-saving surgery.

Oftentimes, scientific successes have occurred **because researchers rebelled against the status quo**. In fact, truth be told, there are times when consensual validation **must** be set aside for the sake of truth. If it is not, those of us who work in science shall become little more than cookie-cutter scientists rushing to fit into a predetermined mold created by "the majority."

Darrell Huff once correctly commented, "People can be wrong in the mass, just as they can individually" (1959, p. 122). If something is true, stating it a million times does not make it any truer. Similarly, if something is false, stating it a million times does not make it true. And the prestige of a position's advocates has nothing to do with whether or not the fact is true or false. It is incorrect (to choose just one well-known example) to suggest that because a Nobel laureate states something, then it must be true. Were that the case, when Nobel laureate W.B. Shockley suggested that highly intelligent women should be artificially inseminated using spermatozoa from Nobel Prize winners to produce super-intelligent offspring, we ought to have taken him up on his suggestion. Of course, such an idea was based on nothing more than the narcissistic dreamings of an over-inflated ego. As Ian Taylor observed, "Status in the field of science is no guarantee of the truth" (1984, p. 226). Factual knowledge is **not** based on: (a) the number of people supporting the claim; or (b) the importance of the one(s) making that claim.

But I digress. Returning to the alleged factuality of evolution, Dr. Gould boasted in a guest editorial in the August 23, 1999 issue of *Time* magazine that "evolution is as well documented as any phenomenon in science, as strongly as the earth's revolution around the sun rather than vice versa. In this sense, we can call evolution a 'fact'" (154[8]:59).] Gould made it clear that he was quite upset because some people refuse to acknowledge evolution as a fact. According to him, "evolution is a fact, like apples falling out of trees" (as quoted in Adler, 1980, 96[18]:95).

Twelve years after Dr. Gould's *Discover* article was published, evolutionist Robert Pennock employed the same plan of attack in his book, *Tower of Babel*.

> "Biologists take Darwin's thesis of the history of descent with modification from common ancestors to be a fact. The key evolutionary mechanisms of variation by mutation and recombination, genetic inheritance, natural selection, random drift, and so on are also known to be **factual**. Many broad features of the evolutionary pathways are also accepted as fact. All these core conclusions are based on such overwhelming observational and experimental evidence, both indirect and direct, that it is highly unlikely that they could ever be overturned. These are all parts of evolutionary theory and they are also all facts. **There are other evolutionary hypotheses that have not yet garnered sufficient evidence and whose 'facthood' is still in question**, especially ones having to do with particular pathways of descent or with the relative importance of natural selection versus drift, for example, as the cause of some particular biological feature. **It is also accepted that the theory of evolutionary processes is incomplete, that many details of the mechanisms have yet to be worked out**, and that there could be as yet unknown processes working in tandem with the known mechanisms that are important in generating the patterns of order and disorder that characterize the biological world. As research uncovers more about these processes, we can expect that new findings will supplement and refine evolutionary theory but not undermine the factual elements that the evidence has already established" (1999, p. 177, emp. added).

And so, we are told, the "fact" of evolution is well established, even though there are "other evolutionary

hypotheses" yet to be worked out. This is an odd turn of events. Why so?

A **fact** normally is defined as an actual occurrence or something that has real existence. A **theory** is a plausible principle or body of principles—supported by at least some facts—intended to explain various phenomena. With those standard-usage definitions in mind, consider the following in regard to evolutionary "theory."

Charles Darwin, in his *Origin of Species*, stated, "Long before the reader has arrived at this part of my work, a crowd of difficulties will have occurred to him. Some of them are so serious that to this day I can hardly reflect on them without being in some degree staggered" (1859, p. 158). Theodosius Dobzhansky, the late, eminent geneticist of the Rockefeller University, stated in his book, *The Biological Basis of Human Freedom*, "Evolution as a historical fact was proved beyond reasonable doubt not later than in the closing decades of the nineteenth century." Yet two pages later he admitted, "There is no doubt that both the historical and the causal aspects of the evolutionary process are **far from completely known**.... The causes which have brought about the development of the human species **can be only dimly discerned**" (1956, pp. 6,8-9, emp. added). Notice Dobzhansky's admission that both the historical (what Gould refers to as the "fact" of evolution) and the causal (what Gould refers to as the "theory" of evolution) are "far from completely known."

In other words, on the one hand evolution is declared to be a fact, yet on the other hand its defenders readily acknowledge that the process: (a) is "far from completely known"; (b) has causes that are "only dimly discerned"; and (c) is plagued with difficulties that are "staggering." Evolutionist W. LeGros Clark wrote, "What was the ultimate origin of man?... Unfortunately, any answers which can at present be given to these questions are based on indirect evidence and thus **are largely conjectural**" (1955, p. 174, emp. added). Evolutionist George Kerkut concluded,

> "...I believe that the theory of Evolution as presented by orthodox evolutionists is in many ways a satisfying explanation of some of the evidence. At the same time I think that the attempt to explain all living forms in terms of evolution from a unique source...is premature and **not satisfactorily supported by present-day evidence**.... [T]he supporting evidence remains to be discovered.... We can, if we like, believe that such an evolutionary system has taken place, but I for one do not think that 'it has been proven beyond all reasonable doubt.' ...It is very depressing to find that many subjects are being encased in scientific dogmatism" (1960, pp. vii, viii, emp. added).

After listing and discussing the seven **non-provable assumptions** upon which evolution is based, Dr. Kerkut then observed, "The first point that I should like to make is that these seven assumptions by their nature **are not capable of experimental verification**" (p. 7, emp. added). [NOTE: If you are concerned because I am including quotations from as long ago as the 1950s and 1960s, please keep reading. You will see that there is method to my madness.]

As it turns out, Dr. Kerkut's stinging rebuke of the alleged factuality of evolution was hardly an isolated instance. W.R. Thompson, while serving as Director of the Commonwealth Institute of Biological Control in Canada, was asked to write the "Introduction" to the 1956 edition of Darwin's *Origin of Species*. He accepted the offer, and then wrote,

> "Darwin did not show in the *Origin* that species had originated by natural selection; he merely showed, on the basis of certain facts and assumptions, how this **might** have happened, and as he had convinced himself he was able to convince others.... On the other hand, it does appear to me that Darwin in the *Origin* was not able to produce palaeontological evidence sufficient to prove his views but that **the evidence he did produce was adverse to them**; and I may note that the position is not notably different today. The modern Darwinian palaeontologists are obliged, just like their predecessors and like Darwin, to **water down the facts** with subsidiary hypotheses which, however plausible, are in the nature of things unverifiable" (pp. xii, xix, emp. added).

Or, as Charles Darwin's brother, Erasmus, put it in a letter to Charles on November 23, 1859 (one day before the publication of *The Origin of Species*, "Concerning species, in fact the *a priori* reasoning is so entirely satisfactory to me that if the facts won't fit, why, so much the worse for the facts, in my feeling" (as quoted in Francis Darwin, 1889, 2:29).

Evolutionists dogmatically assert that evolution is a fact, yet admit that it: (a) is based upon **non-provable assumptions** that are "not capable of experimental verification"; (b) bases its conclusions upon answers that are "largely conjectural"; (c) is faced with evidence "adverse" to the available facts; (d) is built upon "watered-down" facts; and (e) has both historical and causal aspects that "are far from completely known." Little wonder Dr. Kerkut stated concerning the theory of evolution, "The evidence that supports it is not sufficiently strong to allow us to consider it anything more than a working hypothesis" (1960, p. 157). That is a far cry from the assessments of Rennie, Gould, Pennock, and their colleagues in the evolutionary camp.

Someone might object, however, that some of the quotations I have employed (from evolutionists such as Simpson, Dobzhansky, Clark, Kerkut, and others) to document the non-verifiability of evolution are from as long ago as the 1950s and 1960s. Much scientific research on evolution has occurred in the decades that followed, and thus some might consider it as a bit unfair to rely on such "dated" critiques of a concept like evolution that changes so rapidly and that has been studied so intensely.

But please keep reading. I intentionally began with quotations from the 1950s and 1960s in order to document that the situation over the past four decades has not improved. By the 1970s, for example, little to nothing had changed. At the height of his professional career, Pierre-Paul Grassé was considered by many to be France's greatest living zoologist. In fact, Dobzhansky wrote of him, "Now one can disagree with Grassé, but not ignore him. He is the most distinguished of French zoologists, the editor of the 28 volumes of *Traité de Zoologie*, author of numerous original investigations, and ex-president of the Academie des Sciences. His knowledge of the living world is encyclopedic" (1975, 29:376). In 1977 Dr. Grassé wrote in *The Evolution of Living Organisms*,

> "Today our duty is to destroy the myth of evolution, considered as a simple, understood, and explained phenomenon which keeps rapidly unfolding before us. Biologists must be encouraged to think about the weaknesses and extrapolations that theoreticians put forward or lay down as established truths. The deceit is sometimes unconscious, but not always, since some people, owing to their sectarianism, purposely overlook reality and refuse to acknowledge the inadequacies and falsity of their beliefs.
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> "Their success among certain biologists, philosophers, and sociologists notwithstanding, **the explanatory doctrines of biological evolution do not stand up to an objective, in-depth criticism**. They prove to be either in conflict with reality or else incapable of solving the major problems involved" (pp. 8,202, emp. added).

Three years later, in 1980, British evolutionary physicist H.S. Lipson produced a thought-provoking piece in the May issue of *Physics Bulletin* (a refereed science journal). In "A Physicist Looks at Evolution," Dr. Lipson commented first on his interest in life's origin and, second, on his non-association with creationists. He then noted, "In fact, evolution became in a sense a scientific religion; almost all scientists have accepted it and many are prepared to 'bend' their observations to fit with it." Lipson went on to inquire as to how well evolution has withstood years of scientific testing, and suggested that "to my mind, the theory does not stand up at all." Like other evolutionists who have voiced similar views, Dr. Lipson hardly was ecstatic about his conclusion—a fact he made clear when he wrote, "I know that this is anathema to physicists" (31:138, emp. in orig.). What a unique idea—actually accepting the experimental evidence rather than changing definitions of standard-usage words (like "theory" or "fact"), or using bombast and vitriol, in an attempt to coerce people into believing evolution.

Just a little over a year afterward, on November 5, 1981, the late Colin Patterson (one of the world's foremost fossil expert who, at the time, was serving as senior paleontologist at the British Museum of Natural History in London and as editor of the professional journal published by the museum) delivered a public address to his evolutionist colleagues at the American Museum of Natural History in New York City. In his speech, Dr. Patterson astonished those colleagues when he stated that he had been "kicking around" non-evolutionary, or "anti-evolutionary," ideas for about eighteen months. As he went on to describe it,

> "One morning I woke up and something had happened in the night, and it struck me that I had been working on this stuff for twenty years and there was not one thing I knew about it. That's quite a shock to learn

> that one can be misled so long. Either there was something wrong with me, or there was something wrong with evolution theory" (1981).

Dr. Patterson said he knew there was nothing wrong with him, so he started asking various individuals and groups a simple question, "Can you tell me anything you know about evolution, any one thing that is true? I tried that question on the geology staff at the Field Museum of Natural History, and the only answer I got was silence." He tried it on the Evolutionary Morphology Seminar at the University of Chicago, a prestigious body of evolutionists, and all he got there "was silence for a long time and eventually one person said, 'I do know one thing—it ought not to be taught in high school.' " Patterson then remarked, "It does seem that the level of knowledge about evolution is remarkably shallow. We know it ought not to be taught in high school, and that's all we know about it."

Patterson went on to say, "Then I woke up and realized that all my life I had been duped into taking evolution as revealed truth in some way." But more important, he termed evolution an "anti-theory" that produced "anti-knowledge." He also suggested that "the explanatory value of the hypothesis is nil," and that evolution theory is "a void that has the function of knowledge but conveys none." To use Patterson's wording, "I feel that the effects of hypotheses of common ancestry in systematics has not been merely boring, not just a lack of knowledge, I think it has been positively anti-knowledge" (1981; cf. Bethell, 1985).

For Dr. Patterson to refer to his newly formed stance as "anti-evolutionary" was quite a change of heart for a man who had authored several books (the last of which was titled simply *Evolution*) in the field that he later acknowledged was capable of producing "anti-knowledge."

But Colin Patterson was not the only one expressing such views. For more than two decades, distinguished British astronomer Sir Fred Hoyle stressed the serious problems—once again, especially from the fields of thermodynamics—with various theories regarding the naturalistic origin of life on the Earth. The same year that Dr. Patterson traveled to America to speak, Dr. Hoyle wrote,

> "I don't know how long it is going to be before astronomers generally recognize that the combinatorial arrangement of not even one among the many thousands of biopolymers on which life depends could have been arrived at by natural processes here on the Earth. Astronomers will have a little difficulty in understanding this because they will be assured by biologists that it is not so, the biologists having been assured in their turn by others that it is not so. The 'others' are a group of persons who believe, quite openly, in mathematical miracles. They advocate the belief that tucked away in nature, outside of normal physics, there is a law which performs miracles (provided the miracles are in the aid of biology). This curious situation sits oddly on a profession that for long has been dedicated to coming up with logical explanations of biblical miracles.... It is quite otherwise, however, with the modern miracle workers who are always to be found living in the twilight fringes of thermodynamics" (1981a, 92:526, parenthetical comment in orig.).

Hoyle then said,

> "At all events, anyone with even a nodding acquaintance with the Rubik cube will concede the near-impossibility of a solution being obtained by a blind person moving the cubic faces at random. Now imagine 10^{50} blind persons each with a scrambled Rubik cube, and try to conceive of the chance of them all **simultaneously** arriving by random shuffling at just one of the many biopolymers on which life depends. The notion that not only biopolymers but the operating programme of a living cell could be arrived at by chance in a primordial organic soup here on the Earth is evidently nonsense of a high order" (1981b, 294:527, emp. in orig.).

Hoyle, and Chandra Wickramasinghe (professor of astronomy and applied mathematics at the University College, Cardiff, Wales), went even farther. Using probability figures applied to cosmic time (not just geologic time here on the Earth), their conclusion was as follows:

> "Once we see, however, that the probability of life originating at random is so utterly minuscule as to make the random concept absurd, it becomes sensible to think that the favourable properties of physics on which life depends, are in every respect deliberate.... It is therefore almost inevitable that our own measure of intelligence must reflect in a valid way the higher intelligences...even to the extreme idealized limit of God" (1981, pp. 141,144, emp. in orig.).

Hoyle and Wickramasinghe suggested, however, that this "higher intelligence" did not necessarily have to be, as far as they were concerned, what most people would call "God," but simply a being with an intelligence "to the limit of God." They, personally, opted for "directed panspermia," a view which suggests that life was "planted" on the Earth via genetic material that originated from a "higher intelligence" somewhere in the Universe. One year later Dr. Hoyle wrote,

> "A common sense interpretation of the facts suggests that **a superintellect** has monkeyed with physics, as well as with chemistry and biology, and that there are no blind forces worth speaking about in nature. The numbers one calculates from the facts seem to me so overwhelming as to put this conclusion almost beyond question" (1982, 20:16, emp. added).

Three years after that, in 1985, molecular biologist Michael Denton authored *Evolution: A Theory in Crisis*, in which he stated,

> "In this book, I have adopted the radical approach. By presenting a systematic critique of the current Darwinian model, ranging from paleontology to molecular biology, I have tried to show why I believe that the problems are too severe and too intractable to offer any hope of resolution in terms of the orthodox Darwinian framework, and that consequently the conservative view is no longer tenable.
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> "The intuitive feeling that pure chance could never have achieved the degree of complexity and ingenuity so ubiquitous in nature has been a continuing source of scepticism ever since the publication of the *Origin*; and throughout the past century there has always existed a significant minority of first-rate biologists who have never been able to bring themselves to accept the validity of Darwinian claims. In fact, the number of biologists who have expressed some degree of disillusionment is practically endless.
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> "The anti-evolutionary thesis argued in this book, the idea that life might be fundamentally a discontinuous phenomenon, runs counter to the whole thrust of modern biological thought.... Put simply, no one has ever observed the interconnecting continuum of functional forms linking all known past and present species of life. The concept of the continuity of nature has existed in the mind of man, **never** in the facts of nature" (pp. 16,327,353, emp. in orig.).

In 1987, two years after Denton's book was published, Swedish biologist Søren Løvtrup wrote in an even stronger vein,

> "After this step-wise elimination, only one possibility remains: **the Darwinian theory of natural selection**, whether or not coupled with Mendelism, **is false**. I have already shown that the arguments advanced by the early champions were not very compelling, and that there are now considerable numbers of empirical facts which do not fit with the theory. Hence, **to all intents and purposes the theory has been falsified**, so why has it not been abandoned? I think the answer is that current evolutionists follow Darwin's example—they refuse to accept falsifying evidence" (p. 352, emp. added).

In 1992, Arno Penzias (who fourteen years earlier had shared the 1978 Nobel Prize in physics with Robert W. Wilson for their discovery of the so-called "background radiation" left over from the Big Bang) declared,

> "Astronomy leads us to a unique event, a universe which was created out of nothing, one with the very delicate balance needed to provide exactly the conditions required to permit life, and one which has an underlying (one might say 'supernatural') plan" [p. 83, parenthetical comment in orig.].

In his 1994 book, *The Physics of Immortality*, Frank Tipler (who co-authored with John D. Barrow the massive 1986 volume, *The Anthropic Cosmological Principle*) wrote,

> "When I began my career as a cosmologist some twenty years ago, I was a convinced atheist. I never in my wildest dreams imagined that one day I would be writing a book purporting to show that the central claims of Judeo-Christian theology are in fact true, that these claims are straightforward deductions of the laws of physics as we now understand them. I have been forced into these conclusions by the inexorable logic of my own special branch of physics" (Preface).

Then, in 1998, evolutionist Michael Denton shocked everyone with his book, *Nature's Destiny*, when he admitted,

> "Because this book presents a teleological interpretation of the cosmos which has obvious theological implications, it is important to emphasize at the outset that the argument presented here is entirely consis-

> tent with the basic naturalistic assumption of modern science—that the cosmos is a **seamless unity which can be comprehended ultimately in its entirety by human reason and in which all phenomena, including life and evolution and the origin of man, are ultimately explicable in terms of natural processes**....
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> "Although this is obviously a book with many theological implications, my initial intention was not specifically to develop an argument for design; however, as I researched more deeply into the topic and as the manuscript went through successive drafts, it became increasingly clear that the laws of nature were fine-tuned on earth to a remarkable degree and that the emerging picture provided powerful and self-evident support for the traditional anthropocentric teleological view of the cosmos. Thus, by the time the final draft was finished, the book had become in effect an essay in natural theology in the spirit and tradition of William Paley's *Natural Theology*….
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> "Whether one accepts or rejects the design hypothesis…there is no avoiding the conclusion that the world **looks** as if it has been tailored for life; it **appears to have been designed**. All reality **appears** to be a vast, coherent, teleological whole with life and mankind as its purpose and goal" (pp. xvii-xviii,xi-xii, 387, emp. in orig.).

Such quotations could be multiplied almost endlessly. Furthermore, consider what has **not** been proved in regard to evolution.

First, evolution obviously cannot be established as "factual" unless it can be proved that something nonliving gave rise to something living—that is to say, that spontaneous generation (abiogenesis) occurred. Evolution, in its entirety, is based on this principle. But what evidence is there that the concept of spontaneous generation is, in fact, correct? What evidence is there that life arose from nonlife? In their biology textbook, *Life: An Introduction to Biology*, evolutionists Simpson and Beck begrudgingly admitted that the spontaneous generation of life "does not occur in any known case" (1965, p. 261). Twelve years later, in his book, *Until the Sun Dies*, Robert Jastrow, the founder and former director of the Goddard Institute for Space Studies at NASA, summarized the situation as follows:

> "According to this story, every tree, every blade of grass, and every creature in the sea and on the land evolved out of one parent strand of molecular matter drifting lazily in a warm pool. What concrete evidence supports that remarkable theory of the origin of life? There is none" (1977, p. 60).

Four years after that, in 1981, Sir Fred Hoyle complained in *Nature* magazine,

> "The likelihood of the spontaneous formation of life from inanimate matter is one to a number with 40,000 noughts after it.... It is big enough to bury Darwin and the whole theory of evolution. There was no primeval soup, neither on this planet nor on any other, and **if the beginnings of life were not random, they must therefore have been the product of purposeful intelligence**" (1981b, 294:148, emp. added).

And the situation has not improved in the years since. One of the "scientific heavyweights" in evolutionary origin-of-life studies is Leslie Orgel, who has spent most of his professional career attempting to uncover the secrets of how life began on this planet. In the October 1994 issue of *Scientific American*, Dr. Orgel authored an article titled "The Origin of Life on Earth" in which he admitted,

> "It is extremely improbable that proteins and nucleic acids, both of which are structurally complex, arose spontaneously in the same place at the same time. Yet it also seems impossible to have one without the other. And so, at first glance, one might have to conclude that life could never, in fact, have originated by chemical means....
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> "We proposed that RNA might well have come first and established what is now called the RNA world.... This scenario could have occurred, we noted, if prebiotic RNA had two properties not evident today: a capacity to replicate without the help of proteins and an ability to catalyze every step of protein synthesis....
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> "The precise events giving rise to the RNA world remain unclear. As we have seen, investigators have proposed many hypotheses, but evidence in favor of each of them is fragmentary at best. The full details of how the RNA world, and life, emerged may not be revealed in the near future" (271:78,83, emp. added).

When Dr. Orgel suggested that "the full details of how the RNA word, and life, emerged may not be revealed in the near future," he hardly overstated the fact of the matter, as you will see in the section below on "The Naturalistic Origin of Life."

Second, not only is the inability of **how** to get life started a serious stumbling block for evolutionists, but now the **where** of this supposed happening has been called into question as well. Hoyle and Wickramasinghe have argued that life fell to Earth from space after having evolved from the warm, wet nucleus of a comet (see Gribbin, 1981; Hoyle and Wickramasinghe, 1981). Sir Francis Crick, co-discoverer of the structure of the DNA molecule, has suggested that life actually was sent here from other planets (1981). Meanwhile, back on Earth, Sidney Fox and colleagues have proposed that life began on the side of a primitive volcano on our primeval planet when a number of dry amino acids "somehow" formed there at exactly the right temperature, for exactly the right length of time, to form exactly the right molecules necessary for living systems (1977). Evolutionists (remember Gould?) are fond of saying that there is no controversy over the **fact** of evolution; it is only the "how" about which they disagree. **Not true. They cannot even agree on the "where!"**

Of course, some evolutionists attempt to argue that such matters are not properly discussed as a part of the evolutionary process, and that evolution *per se* applies only to biological change. One outspoken evolutionist, Douglas Theobald, went even farther than that, however, when he explained why he had **not** included the topic of abiogenesis in a lengthy document that he prepared for distribution online. He wrote, "Furthermore, because it is not part of evolutionary theory, abiogenesis is not considered in this discussion of macroevolution: abiogenesis is an independent hypothesis. **In evolutionary theory it is taken as axiomatic that an original self-replicating life form existed in the distant past, regardless of its origin**" (1999, emp. added). For Theobald, no "proof" of the origin of life is needed; it is simply "taken as axiomatic." Nice trick—if you can pull it off.

Stephen J. Gould also tried to convince people that abiogenesis should not be included under the "evolution umbrella." He wrote,

> "Evolution is not the study of life's ultimate origin as a path toward discerning its deepest meaning. **Evolution, in fact, is not the study of origins at all.** Even the more restricted (and scientifically permissible) question of life's origin on our earth lies outside its domain. (This interesting problem, I suspect, falls primarily within the purview of chemistry and the physics of self-organizing systems.) Evolution studies the pathways and mechanisms of organic change **following** the origin of life" (1987b, 96[10]:18, parenthetical comments in orig., emp. added).

Some of Gould's evolutionary colleagues, however, vehemently disagreed with his attempt to limit evolution to "the pathways and mechanisms of organic change **following** the origin of life." In the minds of many, Dobzhansky settled the matter once and for all when he wrote twenty years earlier,

> "Evolution comprises all the stages of development of the universe: the cosmic, biological, and human or cultural developments. Attempts to restrict the concept of evolution to biology are gratuitous. Life is a product of the evolution of inorganic matter, and man is a product of the evolution of life" (1967, 55:409).

Paul A. Moody, in his widely used textbook, *Introduction to Evolution*, put it like this: "Organic evolution is the greatest principle in biology. Its implications extend far beyond the confines of that science, ramifying into all phases of human life and activity" (1962, p. 1x.).

Thus, to use the evolutionists' own words, any attempt to restrict evolution to certain areas is "gratuitous." For once, non-evolutionists could not agree any more than they do with their evolutionary counterparts. Evolutionists should not be upset with non-evolutionists for insisting that evolutionary constructs apply to **every** aspect of existence, since even well-known advocates of evolutionary theory agree that evolution applies to "all phases of human life and activity," and "comprises **all** the stages of development of the universe: the cosmic, biological, and human or cultural developments." Whether some evolutionists like it or not, the fact remains that **evolution is a complete cosmogony**, and as such applies to…well…**the entire Universe**.

Of course, considering the dismal state of evolution-based efforts to try to invent some sort of believable (much less provable) concept of how inorganic matter could have given rise to living organisms,

it is easy to understand why certain evolutionists insist that the topic of abiogenesis remain as an "independent hypothesis" outside the scope of evolution. Furthermore, if evolutionary theory applies to the Universe as a whole (and not just biology), then evolutionists are forced to face the insuperable problem of the non-eternality of matter. If evolutionary theory is allowed to apply to physics, then evolutionists meet head-on the problem of the inviolable second law of thermodynamics. If evolutionary theory is allowed to apply to ethics, then evolutionists have the problem of how to establish any kind of objective moral standard. And so on and so on. Because evolution is an entire cosmogony, it **must** explain **everything**—and it must do so **naturally**. With that impossible task as its ultimate goal, it is no great surprise that evolution's proponents sometimes try to define their theory with phrases like "the process by which different kinds of living organisms are thought to have developed and diversified from earlier forms during the history of the earth." In warfare, that is known as "cutting your losses." In science it is referred to as "built-in bias." And since science (from the Latin *scientia*) by definition means "knowledge," neither bias nor prejudice should have any place in the scientific arena.

Third, in his January 1987 *Discover* article, Dr. Gould, discussed some of the "data" that establish evolution as a "fact" (his statement was that "facts are the world's data"). An examination of these data **disproves** the very thing that Gould was attempting to prove—the "factuality" of evolution. He commented,

> "We have direct evidence of small-scale changes in controlled laboratory experiments of the past hundred years (on bacteria, on almost every measurable property of the fruit fly *Drosophila*), or observed in nature (color changes in moth wings, development of metal tolerance in plants growing near industrial waste heaps) or produced during a few thousand years of human breeding and agriculture" (1987a, 8[1]:65, parenthetical items in orig.).

Dr. Gould thus wants us to believe that such changes **prove** evolution to be a fact. Yet notice what the professor conspicuously omitted. He failed to tell the reader what he stated publicly during a speech at Hobart College, February 14, 1980, when he said,

> "A mutation doesn't produce major new raw material. You don't make new species by mutating the species.... That's a common idea people have; that evolution is due to random mutations. A mutation is **not** the cause of evolutionary change" (1984, p. 106, emp. in orig.).

On the one hand, Gould wants us to believe that bacteria and fruit flies have experienced "small-scale changes" via genetic mutations, and thus serve as excellent examples of the "fact" of evolution. But on the other hand, he tells us that mutations ("small-scale changes") do not cause evolution. Which is it?

Furthermore, notice that in Gould's assessment he made the same mistake that Darwin had made 128 years earlier—extrapolating far beyond the available evidence. Darwin looked at finches' beaks, and from such small changes he extrapolated to state that evolution from one group to another had occurred. Gould looked at changes in fruit flies or bacteria and did exactly the same thing, all the while failing to tell the reader that the bacteria never changed into anything else, and that the fruit flies always remained fruit flies. If the "data" are the "facts," and if the "data" actually **disprove** organic evolution, how is it then that evolution can be called, in any sense of the word, a "fact"?

The standard-usage dictionary definition of a fact is something that is "an actual occurrence," something that has "actual existence." Can any process be called "an actual occurrence" when the knowledge of how, when, where, what, and why is missing? Were someone to suggest that a certain skyscraper had merely "happened," but that the how, when, where, what, and why were complete unknowns, would you be likely to call it a fact, or an "unproven assertion"? To ask is to answer. Simpson, Gould, Rennie, Pennock, and other evolutionists may ask us to believe that their unproven theory somehow has garnered to itself the status of a "fact," but if they do, they will have to come up with something better than wishful thinking. Merely trying to alter, for their own purposes, the definition of "fact" will not suffice.

Pardon me for my incredulity, but when evolutionists offer up a completely inadequate explanation for life's origin in the first place, an equally insufficient mechanism for the evolution of that life once it "somehow" got started via naturalistic processes, and a fossil record full of "missing links" to document its supposed course through time, I will continue to relegate their "fact" to the status of a theory. Adulte-

rating the definition of the word "fact" is a poor attempt by evolutionists (who, to borrow Gould's phrase "should know better") to lend credence to a theory that lacks such factual merit. Little wonder that evolutionist Michael Denton wrote concerning Darwin,

> "His general theory that all life on earth had originated and evolved by a gradual successive accumulation of fortuitous mutations, **is still, as it was in Darwin's time, a highly speculative hypothesis entirely without direct factual support and very far from that self-evident axiom some of its more aggressive advocates would have us believe**" (1985, p. 77, emp. added).

My point exactly.

NON-EVOLUTIONIST'S SECOND AFFIRMATIVE: THE MYSTERY OF THE NATURALISTIC ORIGIN OF LIFE

As an unbiased observer makes his way through the literature dealing with the alleged factuality of organic evolution, from time to time he very likely will stop to ponder the numerous items that evolutionary scientists forthrightly admit are **unknown** or **unknowable**. In fact, truth be told, in certain instances such an unbiased observer might justifiably draw the conclusion that the number of things that are unknown or unknowable actually outweigh the number that are known. It often appears that theories increasingly eclipse facts, problems greatly exceed solutions, questions vastly outnumber answers, and doubts routinely overshadow certainties. Little is what it seems.

Think that such a summation is an exaggeration? Think again. In the specific areas of evolutionary thought that are incontrovertibly the most important for the theory's hegemony and success, one finds at every turn "challenges," "problems," "quandaries," "enigmas," "mysteries," "puzzles," and "disappointments" (and yes, at times even a fairly hefty dose of obfuscation). I would like to like to illustrate this point by presenting a few examples, beginning with an issue that is critical to the success of evolutionary theory: **the naturalist origin of life**. Interestingly, on occasion evolutionists themselves admit the serious nature of the problem inherent in their theory caused by the supposed significant leap from something that is inorganic and nonliving to something that is organic and living. John Horgan concluded that if he was a non-evolutionist, he would focus on the subject of the origin of life because it "...is by far the weakest strut of the chassis of modern biology. The origin of life is a science writer's dream. It abounds with exotic scientists and exotic theories, which are never entirely abandoned or accepted, but merely go in and out of fashion" (1996, p. 138). Like I said above, theories increasingly eclipse facts, and little is what it seems.

[NOTE: In this discussion, I will be using terms such as spontaneous generation, abiogenesis, biopoiesis, biochemical evolution, and so on to refer to the naturalistic origin of life. When I mention "spontaneous generation," unless otherwise indicated I will be using the term as a synonym for abiogenesis, rather than as a historical reference to outdated concepts which suggested that microorganisms arose from broth, flies were spawned from rotting meat, etc.]

Evolutionary theory postulates that life arose from nonliving matter as a result of purely naturalistic, completely mechanistic processes on a prebiotic Earth. In fact, this claim is one of the foundational concepts of organic evolution. As numerous writers have repeatedly pointed out, if abiogenesis is practically or probabilistically impossible, then so is evolutionary naturalism (Dover, 1999; Dawkins, 1996; de Duve, 1995; Denton, 1998). When famed British evolutionist George Kerkut published his classic book, *The Implications of Evolution*, and brazenly listed the **seven nonprovable assumptions upon which evolution is based**, it was not by accident that the number-one item in his list was, "The first assumption is that non-living things gave rise to living material, i.e., spontaneous generation occurred" (1960, p. 6). When evolutionary geneticist Theodosius Dobzhansky opined that "life is a product of the evolution of inorganic matter" (1967, 155:409, emp. added), he could not have been more correct. This point probably is so obvious as to need no comment, since **if something cannot live, it obviously cannot evolve**. As evolutionist Eugenie Scott exclaimed, "**Life** had to **precede** evolution!" (2004, pp. 26-27, emp. added).

True enough—but far easier said than done, for several reasons. In fact, perhaps this would be a good time to remind the reader about the fundamental law of biology—**the law of biogenesis**. This law

was recognized many years ago as dictating what both theory and experimental evidence showed to be true—**that life comes only from preceding life, and perpetuates itself by reproducing only its own kind or type**. As David Kirk correctly remarked,

> "By the end of the nineteenth century there was general agreement that life cannot arise from the nonliving under conditions that now exist upon our planet. The dictum 'All life from preexisting life' became the dogma of modern biology, from which no reasonable man could be expected to dissent" (1975, p. 7).

The experiments that ultimately formed the scientific foundation of this law were first carried out by such men as Francesco Redi (1688) and Lazarro Spallanzani (1799) in Italy, Louis Pasteur (1860) in France, and Rudolph Virchow (1858) in Germany. It was Virchow who documented that cells do not arise from amorphous matter, but instead come only from preexisting cells. The *Encyclopaedia Britannica* stated concerning Virchow that "His aphorism '*omnis cellula e cellula*' (every cell arises from a preexisting cell) ranks with Pasteur's '*omne vivum e vivo*' (every living thing arises from a preexisting living thing) among the most revolutionary generalizations of biology" (see Ackerknect, 1973, p. 35).

Down through the centuries, countless thousands of scientists in various disciplines have established the law of biogenesis as just that—a scientific **law** stating that life comes only from preexisting life of its kind. Interestingly, the law of biogenesis was firmly established in science long before the contrivance of modern evolutionary theories. Also of considerable interest is the fact that students are consistently taught in high school and college biology classes the tremendous impact of, for example, Pasteur's work on the then-popular idea of spontaneous generation. Students are presented (often with considerable flourish) the fascinating historical scenario of how Pasteur "triumphed over mythology," and by doing so provided science with "one of its finest hours" as he discredited the false concept of spontaneous generation. Yet, then with almost the next breath, the teacher or professor informs his or her students that evolution is supposed to have started via spontaneous generation (abiogenesis, biopoiesis, biochemical evolution, etc.).

Neither this incredible inconsistency nor the undeniable impact of the law of biogenesis has escaped the capable, cautious eyes of certain astute evolutionary scholars, among them the eminent Noble laureate of Harvard, George Wald, who was constrained to write,

> "We tell this story to beginning students in biology as though it represented a triumph of reason over mysticism. In fact it is very nearly the opposite. The reasonable view was to believe in spontaneous generation; the only alternative, to believe in a single, primary act of supernatural creation. There is no third position. For this reason many scientists a century ago chose to regard the belief in spontaneous generation as a '**philosophical necessity**.' It is a symptom of the philosophical poverty of our time that this necessity is no longer appreciated. Most modern biologists, having reviewed with satisfaction the downfall of the spontaneous generation hypothesis, yet unwilling to accept the alternative belief in special creation, are left with nothing.
>
> "**I think a scientist has no choice but to approach the origin of life through a hypothesis of spontaneous generation**. What the controversy reviewed above showed to be untenable is only the belief that living organisms arise spontaneously under present conditions. We have now to face a somewhat different problem: how organisms may have arisen spontaneously under different conditions in some former period, granted that they do so no longer" (1954, 191[2]:46, emp. added).

Thus, with one fell swoop of his pen Dr. Wald:

- Conceded that, as a "philosophical necessity," those who choose to believe in evolution also must simultaneously believe in spontaneous generation
- Acknowledged that there are only two choices regarding origins—natural or supernatural
- Confessed that evolutionists (regardless of what practical experience and/or scientific evidence indicates) have "no choice but to approach the origin of life through a hypothesis of spontaneous generation"
- Admitted that, in light of past scientific experimental evidence (which established the impossibility of spontaneous generation and the legitimacy of the law of biogenesis), evolutionists

now "have to face a somewhat different problem: how organisms may have arisen spontaneously under different conditions in some former period, granted that they do so no longer"

- And, last but not least (as a result of his statement that "organisms may have arisen spontaneously under different conditions in some former period, [but] do so no longer"), completely ignored both substantive uniformitarianism (admittedly one of evolution's most-treasured icons) and methodological uniformitarianism (one of science's most-useful tools)—by suggesting that while the processes we observe (such as the law of biogenesis) do indeed work **today**, they apparently must **not** have worked **in the distant past** (per standard evolutionary uniformitarian concepts)

Such points may have escaped various inexperienced students, but they certainly have not been lost on evolutionary scholars, who confess to having some difficulty with the problem posed by the inexorable law of biogenesis. George Gaylord Simpson and W.S. Beck, in their biology textbook, *Life: An Introduction to Biology*, stated that "...there is no serious doubt that biogenesis is the rule, that life comes only from other life, that a cell, the unit of life, is **always and exclusively** the product or offspring of another cell" (1965, p 144, emp. added). [Do you think that Simpson and Beck simply were unacquainted with Wald's pronouncements of eleven years earlier that it is a "philosophical necessity" that scientists believe in spontaneous generation? Or, is it more probable that they simply were addressing the actual scientific evidence?] Martin A. Moe, writing in *Science Digest*, put it in these difficult-to-misunderstand words:

> "A century of sensational discoveries in the biological sciences has taught us that **life arises only from life**, that the nucleus governs the cell through the molecular mechanisms of deoxyribonucleic acid (DNA) and that the amount of DNA and its structure determine not only the nature of the species but also the characteristics of individuals" (1981, p. 36, emp. added).

Non-evolutionists certainly agree. R.L. Wysong, in his book, *The Creation-Evolution Controversy*, commented,

> "…biopoiesis and evolution describe events that stand in stark naked contradiction to an established law. The law of biogenesis says life arises only from preexisting life, biopoiesis says life sprang from dead chemicals; evolution states that life forms give rise to new, improved and different life forms, the law of biogenesis says that kinds only reproduce their own kinds. Evolutionists are not oblivious to this law" (1976, pp. 182,185).

As Simpson and Beck's comments clearly show, Dr. Wysong is correct when he says regarding the law of biogenesis, "Evolutionists are not oblivious to this law." No, they are not.

Moore and Slusher, in their text, *Biology: A Search for Order in Complexity*, observed, "Historically the point of view that **life comes only from life** has been so well established through the facts revealed by experiment that it is called the Law of Biogenesis." In a footnote accompanying that statement, the authors stated further, "Some scientists call this a **superlaw**, or a law about laws. Regardless of terminology, biogenesis has the highest rank in these levels of generalization" (1974, p. 74, emp. in orig.). Yes, it certainly does—which is why it holds the status of a scientific law ("an actual regularity in nature," Hull, 1974, p. 3) rather than a theory or hypothesis.

Has the law of biogenesis somehow been disproved? Not at all. In fact, to the contrary, every piece of available scientific evidence still supports the basic concept that life arises only from preexisting life. Is biogenesis no longer an "actual regularity in nature"? On the contrary, every piece of available scientific information we possess shows that it is, in fact, just that—"an actual regularity in nature." Has biogenesis somehow ceased being experimentally reproducible? No, it has not.

Why, then, do evolutionists seemingly ignore this important, undeniable law of science? The answer—taking Dr. Wald's comments at face value—is obvious. If evolutionists accept biogenesis as a law, how, then, could evolution ever get started? Biogenesis (the **law** of biogenesis) represents the complete undoing of evolutionary theory from the ground floor up. Little wonder, then, that so many modern-day evolutionists choose to simply ignore the implications of the law of biogenesis and hold instead to a belief in spontaneous generation (as, to quote Wald, "a philosophical necessity").

Regardless of evolutionists' efforts, one thing remains certain: the "dogma of modern biology, from which no reasonable man could be expected to dissent," is **still** biogenesis. J.W.N. Sullivan, brilliant scientist of a generation ago, penned the following words, which are as applicable today as they were the day he wrote them.

> "The beginning of the evolutionary process raises a question which is yet unanswerable. What was the origin of life on this planet? Until fairly recent times there was a pretty general belief in the occurrence of "spontaneous generation." ...But careful experiments, notably those of Pasteur, showed that this conclusion was due to imperfect observation, and **it became an accepted doctrine that life never arises except from life. So far as the actual evidence goes, this is still the only possible conclusion. But since it is a conclusion that seems to lead back to some supernatural creative act, it is a conclusion that scientific men find very difficult of acceptance"** (1933, p. 94, emp. added)**.**

I cannot help but wonder (especially in light of Wald's "philosophical necessity" comment) if Dr. Sullivan's modern-day evolutionary colleagues find it difficult to admit to themselves (or to others) that "life never arises except from life" simply because it "leads back to some supernatural creative act"? Something to think about, eh?

Evolution, of course, cannot be **proven true** unless it can be **proven** that something nonliving gave rise to something living—that is to say, spontaneous generation must have occurred. Evolution, in its entirety, is based on this pivotal principle. [INTERESTING SIDE NOTE: Because of the serious problems associated with getting something nonliving to give rise to something living (naturalistically), evolutionists often do everything within their power to separate "evolution" from "origin-of-life" scenarios—just as Eugenie Scott tried to do when she wrote, "Although some people confuse the origin of life itself with evolution, the two are conceptually separate. Biological evolution is defined as decent of living things from ancestors from which they differ" (2004, pp. 26-27). Did you notice her sleight-of-hand (or should I say "sleight-of-pen") trick when she put the word "biological" in front of "evolution" instead of simply saying, "Evolution is defined as…"? Nevertheless, as I noted earlier, Scott still ended up having to admit, "Life had to precede evolution!" And how, exactly, did that original life get started? If pressed, would she admit that it…uh…"**evolved**"? To ask is to answer, is it not?]

But what evidence is there that the concept of spontaneous generation (abiogenesis, biopoiesis, biochemical evolution) is, in fact, correct? What evidence is there that life arose from nonlife? Notice the progression in the scientific literature over the past fifty years concerning this matter.

Evolutionary anthropologist Loren Eiseley summed up the matter quite well in his classic text, *The Immense Journey*, when he said,

> "With the failure of these many efforts, science was left in the somewhat embarrassing position of having to postulate theories of living origins which it could not demonstrate. **After having chided the theologian for his reliance on myth** and **miracle, science found itself in the unenviable position of having to create a mythology of its own: namely, the *assumption* that what, after long effort, could not be proved to take place today, had, in truth, taken place in the primeval past**" (1957, pp. 201-202, emp. and italics added).

Four years later, Harry Fuller and Oswald Tippo admitted in their text, *College Botany*,

> "The evidence of those who would explain life's origin on the basis of the accidental combination of suitable chemical elements is no more tangible than that of those people who place their faith in Divine Creation as the explanation of the development of life. Obviously the latter have just as much justification for their belief as do the former" (1961, p. 25).

Another four years later, Simpson and Beck writing in their textbook, *Life: An Introduction to Biology*, begrudgingly admitted that the spontaneous generation of life "does not occur in any known case" (1965, p. 261). Evolutionists D.E. Green and R.F. Goldberger, in speaking of the concept of spontaneous generation, wrote in their text, *Molecular Insights into the Living Process*,

> "There is one step [in evolution] that far outweighs the others in enormity: the step from macromolecules to cells. All the other steps can be accounted for on theoretical grounds—if not correctly, at least elegantly. However, **the macromolecule to cell transition is a jump of fantastic dimensions, which lies**

> **beyond the range of testable hypothesis**. In this area, all is conjecture. The available facts do not provide a basis for postulation that cells arose on this planet. This is not to say that some paraphysical forces were not at work. **We simply wish to point out that there is no scientific evidence**" (1967, pp. 406-407, emp. added).

I realize that I already have quoted Robert Jastrow of NASA (in my discussion on the alleged factuality of evolution), but his previous quotation (which came ten years after the admission by Green and Goldberger that "there is no scientific evidence" for the naturalistic origin of life) bears repeating here as well. In *Until the Sun Dies*, Dr. Jastrow lamented,

> "According to this story, every tree, every blade of grass, and every creature in the sea and on the land evolved out of one parent strand of molecular matter drifting lazily in a warm pool. What concrete evidence supports that remarkable theory of the origin of life? There is none" (1977, p. 60).

And, in this specific context, Sir Fred Hoyle's earlier complaint from *Nature* also bears repeating:

> "The likelihood of the spontaneous formation of life from inanimate matter is one to a number with 40,000 noughts after it.... It is big enough to bury Darwin and the whole theory of evolution. There was no primeval soup, neither on this planet nor on any other, and **if the beginnings of life were not random, they must therefore have been the product of purposeful intelligence**" (1981b, 294:148, emp. added).

That same year, Nobel laureate Sir Francis Crick wrote,

> "An honest man, armed with all the knowledge available to us now, could only state that in some sense, **the origin of life appears at the moment to be almost a miracle**, so many are the conditions which would have had to have been satisfied to get it going" (1981, p. 88, emp. added).

After another four years had passed, evolutionist Andrew Scott authored an article in *New Scientist* on the origin of life, titled "Update on Genesis," in which he observed,

> "Take some matter, heat while stirring, and wait. That is the modern version of Genesis. The "fundamental" forces of gravity, electromagnetism and the strong and weak nuclear forces are presumed to have done the rest.... But how much of this neat tale is firmly established, and how much remains hopeful speculation? In truth, the mechanism of almost every major step, from chemical precursors up to the first recognizable cells, is the subject of either controversy or complete bewilderment.
>
> "We are grappling with a classic 'chicken and egg' dilemma. Nucleic acids are required to make proteins, whereas proteins are needed to make nucleic acids and also to allow them to direct the process of protein manufacture itself.
>
> "The emergence of the gene-protein link, an absolutely vital stage on the way up from lifeless atoms to ourselves, is still shrouded in almost complete mystery.... **We still know very little about how our genesis came about, and to provide a more satisfactory account than we have at present remains one of science's great challenges**" (1985, 106:30-33, emp. added).

Three years later, in an article titled "The Origin of Life: More Questions than Answers," eminent origin-of-life researcher Klaus Dose (Director of the Institute for Biochemistry at Johannes Gutenberg University in West Germany) pointed out,

> "More than 30 years of experimentation on the origin of life in the fields of chemical and molecular evolution have led to a better perception of the immensity of the problem of the origin of life on Earth rather than to its solution. **At present all discussions on principal theories and experiments in the field either end in stalemate or in a confession of ignorance**).
>
> "Considerable disagreements between scientists have arisen about detailed evolutionary steps. The problem is that the principal evolutionary processes from prebiotic molecules to progenotes have not been proven by experimentation and that the environmental conditions under which these processes occurred are not known. Moreover, we do not actually know where the genetic information of all living cells originates, how the first replicable polynucleotides (nucleic acids) evolved, or how the extremely complex structure-function relationships in modern cells came into existence.
>
> "**It appears that the field has now reached a stage of stalemate, a stage in which hypothetical arguments often dominate over facts based on experimentation or observation**" (1988, 13[4]:348-349, emp. added).

Three more years passed before Hoyle and Wickramasinghe published an article in *New Scientist* with a catchy title ("Where Microbes Boldly Went") but a dismal message—dismal, that is, for evolutionists who are forced (by what Wald referred to as their "philosophical necessity") to believe in the concept of biochemical evolution, which allegedly produced the first life on Earth by chance processes.

> "Precious little in the way of biochemical evolution could have happened on the Earth. It is easy to show that the two thousand or so enzymes that span the whole of life could not have evolved on the Earth. If one counts the number of trial assemblies of amino acids that are needed to give rise to the enzymes, the probability of their discovery by random shufflings turns out to be less than 1 in $10^{40,000}$" (1991, 91:415).

Those "40,000 noughts" with which Dr. Hoyle was struggling in 1981 still were a thorn in his side ten years later. And the situation has not improved in the years since. Physicist Paul Davies and his co-author Phillip Adams fairly well summarized the problem when they wrote two years later,

> "Some scientists say, just throw energy at it and it will happen spontaneously. That is a little bit like saying: put a stick of dynamite under the pile of bricks, and bang, you've got a house! Of course you won't have a house, you'll just have a mess. **The difficulty in trying to explain the origin of life is in accounting for how the elaborate organizational structure of these complex molecules came into existence spontaneously from a random input of energy. How did these very specific complex molecules assemble themselves**?" (1998, pp. 47-48, emp. added).

How indeed?! What **were** the naturalistic origins of life on Earth? How **did** something nonliving give rise to something living? *Scientific American's* editor, John Rennie, openly admitted that such issues remain "very much a mystery" (2002, 287[1]:81). The improbable origin of the first life forms (along with a close-up look at what George Wald referred to as the "philosophical necessity" of evolutionists accepting some form of spontaneous generation) was fancifully described by Richard Dawkins in his book, *Climbing Mount Improbable*, when he concluded that the conditions on our newly formed but lifeless planet must have been quite different from what we see today—a time, Dawkins hypothesized, during which there existed

> "no life, no biology, only physics and chemistry, and the details of the Earth's chemistry were very different. Most, though not all, of the informed speculation begins in what has been called the primeval soup, a weak broth of simple organic chemicals in the sea. Nobody knows how it happened but, somehow, without violating the laws of physics and chemistry, a molecule arose that just happened to have the property of self-copying—a replicator. This may seem like a big stroke of luck…. Freakish or not, this kind of luck does happen… [and] it had to happen only once…. What is more, as far as we know, it may have happened on only one planet out of a billion billion planets in the universe. Of course many people think that it actually happened on lots and lots of planets, but we only have **evidence** that it happened on one planet, after a lapse of half a billion to a billion years. So the sort of lucky event we are looking at **could** be so wildly improbable that the chances of its happening, somewhere in the universe, could be as low as one in a billion billion billion in any one year. If it **did** happen on only one planet, anywhere in the universe, that planet has to be our planet—because here we are talking about it (Dawkins, 1996, p. 282-283, emp. in orig.).

There you have it. After reading Dawkins' comments, perhaps you now can better understand what Dr. Kerkut meant when he said, "The first assumption is that non-living things gave rise to living material, i.e., spontaneous generation occurred" (1960, p. 6). Or, to put it in Dawkins-speak, "If it **did** happen on only one planet, anywhere in the universe, **that planet has to be our planet—because here we are talking about it**." Translation: Assume what you were supposed to set out to prove in the first place, and then go merrily on your way as if you had achieved your goal by proving your case. What was it that evolutionist Douglas Theobald said in this regard?—"**In evolutionary theory it is taken as axiomatic that an original self-replicating life form existed in the distant past**" (1999, emp. added). Enough said.

But, again I digress. The main point I would like the reader to notice in Dr. Dawkins' above comments is his suggestion that "informed speculation begins in what has been called the **primeval soup**, a weak broth of simple organic chemicals in the sea. Nobody knows how it happened but, somehow, without violating the laws of physics and chemistry, a molecule arose that **just happened** to have the property of self-copying—a replicator." The so-called "primordial-soup theory" harks back to 1953, when Stanley

Miller (a graduate student at the University of Chicago) and Harold Urey (his major professor) performed a series of experiments intended to recreate the supposed conditions on the early Earth—conditions that Miller assumed to be (to use Dawkins' words) "very different."

Miller constructed an apparatus that supposedly re-created those alleged early conditions (i.e., a strongly reducing atmosphere with no free oxygen, which would have been destructive to the products Miller had hoped might form; see Fox and Dose, 1977, p. 44). Miller filled a sealed glass apparatus containing: (a) the gases that A.I. Oparin had speculated (in his 1924 book, *The Origin of Life*) were necessary to form life—methane, ammonia, and hydrogen (to mimic the conditions that were thought to have existed in Earth's early atmosphere); and (b) water vapor (to simulate the ocean—a.k.a., the "primordial soup"). While keeping the water boiling via a heating coil, Miller ran a high-voltage (60,000 volts) spark through the gas mixture (via a tungsten spark-discharge device intended to simulate lightning on the early Earth) to provide the energy required for forward kinetic movement in the biochemical reactions. Below the apparatus was a water-cooled condenser whose purpose was to cool the mixture and condense the vapor, allowing it to fall into a trap below (see Campbell, et al., 2000). This process continued for the span of one week, after which time the mixture in Miller's flask was found to contain complex amino acids—the essential building blocks of life.

The "primordial-soup" theory suggested that life evolved when organic molecules that originally fell into the primitive oceans from the Earth's early atmosphere were energized by forces such as lightning, ultraviolet light, meteorites, deep-sea hydrothermal vents, hot springs, volcanoes, earthquakes, or discharges from the Sun. If the correct mix of chemicals and energy ended up being present (so the theory suggested), life could be produced spontaneously.

Subsequent to the publication of Miller's work [which, by the way, is still today the main (if not the **only**) origin-of-life scenario included in high school and/or college textbooks that discuss the naturalistic origin of life], evolutionists have claimed that the first life on Earth appeared in a primordial soup. This "warm little pond" (to borrow a phrase from Charles Darwin), so we are told, provided the chemicals that later would form various complex molecules, which eventually brought forth the first life—from which all later life ultimately evolved.

[INTERESTING SIDE NOTE: Perhaps this would be a good place to mention the second assumption (out of the seven major assumptions upon which evolution is based) that George Kerkut included in his landmark book, *The Implications of Evolution*. Number two in Kerkut's list (following the first assumption—that spontaneous generation must have occurred) was, "The second assumption is that spontaneous generation occurred **only once**." Why was Kerkut moved to make such a statement (and to consider it so important as to put it second on his list)? I.S. Shklovskii and his co-author Carl Sagan answered that question when they wrote, "The inner workings of terrestrial organisms—from microbes to men—are so similar in their biochemical details **as to make it highly likely that all organisms on the Earth have evolved from a *single instance of the origin of life***" (1966, p. 183, emp. added). Matt Ridley, in his book, *Genome*, wrote in agreement.

> "Wherever you go in the world, whatever animal, plant, bug or blob you look at, if it is alive, it will use the same dictionary and know the same code. **All life is one**. The genetic code, barring a few tiny local aberrations, mostly for unexplained reasons in the ciliate protozoa, is the same in every creature. We all use exactly the same language. **This means**—and religious people might find this a useful argument—**that there was only one creation, one single event when life was born**.... The unity of life is an empirical fact" (1999, pp. 21-22, emp. added).

In short, the same DNA code runs throughout all living organisms (with only minor variations). Knowing how incredibly complicated that that biochemical code is, and acknowledging the immense improbability of it (to use Dawkins' phrase) "just happening" **even *once***, stretches the imagination almost to credulity. As Sir John Maddox (editor of *Nature* for twenty-five years) confessed, "It was already clear that the genetic code is not merely an abstraction, but the embodiment of life's mechanisms; the consecutive triplets of nucleotides in DNA (called codons) are inherited, but they also guide the construction of proteins. **So it is disappointing that the origin of the genetic code is still as obscure as the origin of life itself**" (1994, 367:111, parenthetical item in orig., emp. added). But **no one** ever would be able to be-

lieve that such an incredibly complex code "just happened" by chance ***twice*—producing the same exact results the second time around** (or the third, or the fourth, or the firth, or…).]

A decade and a half after Miller's work, Professor A.L. McAlester of Yale stated regarding Miller's experiments,

> "These studies have led scientists to visualize a time early in Earth history when the surface was covered with oceans or lakes that were rich in non-biologically produced molecules fundamental to life. The waters of these oceans or lakes have been often described as a 'dilute organic soup,' a concept first developed in the 1920's and 1930's by the English biologist J. B. S. Haldane and the Russian biochemist A. I. Oparin, pioneer workers on the origin of life. In the great burst of interest following Miller's experiment, the ideas of Haldane and Oparin have been greatly expanded, and **a number of speculative hypotheses now attempt to explain the development of the first self-duplicating organisms from the nonliving building blocks of the early organic soup**" (1968, pp. 7-8, emp. added).

By way of summary regarding the "speculative hypotheses" concerning how life is alleged to have first spontaneously developed on Earth, evolutionists have suggested the following essential stages:

- Specific simple molecules underwent spontaneous, random chemical reactions in the so-called "primordial soup" until, after approximately half-a-billion years, complex organic molecules were produced (a process generally referred to as "prebiotic evolution").
- Eventually, molecules that could replicate were formed (the most-common suggestion is that these molecules were nucleic acids), along with enzymes and nutrient molecules that ultimately became enveloped by membranes.
- Cells then somehow "learned" how to reproduce by copying a DNA molecule containing a complete set of instructions for building the next generation of cells. During the reproduction process, random mutations changed the DNA code, thereby producing cells that differed from the original cells.
- The variety of cells generated by this process eventually developed the machinery required to do everything that was necessary to survive, reproduce, and create the next generation of cells. Those cells that were better able to survive became more numerous in the population. [adapted from Wynn and Wiggins, 1997, p. 172]

But, when it comes to the above speculative scenario regarding the naturalistic origin of life, things such as the specific "how" and "where" have been the topic of intense debate within the evolutionary community—and for good reason. As it turns out, Miller's work (as well as Sidney Fox's later work on so-called "microsphere protocells") now has been pretty much marginalized (if not invalidated completely) by subsequent discoveries.

One reason that is the case has to do with the fact that most researchers now believe that free oxygen was present in the early Earth's atmosphere, since that atmosphere would have contained abundant water vapor, and since photodisassociation of water in the upper layers of the atmosphere would have produced molecular oxygen (Scherer, 1985, p. 92). Also, as Thaxton, Bradley, and Olsen noted in their book, *The Mystery of Life's Origin* (1984), there are large amounts of oxidized materials in the Cambrian geological strata, which clearly indicates the presence of oxygen.

One of the stages allegedly involved in chemical evolution is where small organic molecules are supposed to be strung together into longer, chain-like molecules referred to as polymers. Among the most-important polymers, biologically speaking, are starches (polymers of sugars), proteins (polymers of amino acids), and DNA (polymers of nucleotides). The final stage of chemical evolution supposedly involves the chance transformation of organic molecules and polymers into the incredibly complex machinery that composes living cells. In this area, evolutionary speculation is so unrestrained by evidence (or even plausibility) that it allows for almost any claim. Yet while Harvard's George Gaylord Simpson was boasting that "virtually all biochemists agree that life on earth arose spontaneously from nonliving matter" (1964, 143:771), evolutionary biochemists Green and Goldberger were lamenting in their book, *Molecular Insights into the Living Process*,

> "There is one step [in evolution] that far outweighs the others in enormity: the step from macromolecules to cells. All other steps can be accounted for on theoretical grounds—if not correctly, at least elegantly. However, the macromolecule to cell transition is a jump of fantastic dimensions, which lies beyond the range of testable hypothesis. In this area, all is conjecture. **The available facts do not provide a basis for postulation that cells arose on this planet**" 1967, pp. 406-407, emp. added)

Thirty-three years later, Cold Spring Harbor Laboratory researchers Mojzsis, Krishnamurthy, and Arrhenius, concluded in their book, *The RNA World*,

> "However, it is now held to be highly unlikely that the conditions used in these experiments [i.e., the modeling of strongly reducing atmospheres] could represent those in the Archean atmosphere. Even so, scientific articles still occasionally appear that report experiments modeled on these conditions and explicitly or tacitly claim the presence of resulting products in reactive concentrations 'on the primordial Earth' or in a 'prebiotic soup.' The idea of such a 'soup' containing all desired organic molecules in concentrated form in the ocean has been a misleading concept against which objections were raised early. Nonetheless, it still appears in popular presentations perhaps partly because of its gustatory associations" (1999, p. 6).

That same year, evolutionist Noam Lahav wrote in his book, *Biogenesis: Theories of Life's Origin*s,

> "Under slightly reducing conditions, the Miller-Urey action does not produce amino acids, nor does it produce the chemicals that may serve as the predecessors of other important biopolymer building blocks. Thus, by challenging the assumption of a reducing atmosphere, we challenge the very existence of the 'prebiotic soup,' with its richness of biologically important organic compounds. Moreover, so far, no geochemical evidence for the existence of a prebiotic soup has been published. Indeed, a number of scientists have challenged the prebiotic soup concept, noting that even if it existed, the concentration of organic building blocks in it would have been too small to be meaningful for prebiotic evolution" (1999, pp. 138-139).

And, interestingly, the same year that Stanley Miller carried out his work, A.I. Oparin (who is widely regarded as the father of the modern theory of chemical evolution) observed,

> "Even the simplest of these substances [proteins] represent extremely complex compounds, containing many thousands of atoms of carbon, hydrogen, oxygen, and nitrogen arranged in absolutely definite patterns, which are specific for each separate substance. To the student of protein structure the spontaneous formation of such an atomic arrangement in the protein molecule would seem as improbable as would the accidental origin of the text of Virgil's *Aeneid* from scattered letter type" (1953, pp. 132-133).

Not much has changed in that regard in more than half a century, as equally well-known origin-of-life researcher Leslie Orgel made perfectly clear when he wrote,

> "There is no agreement on the extent to which metabolism could develop independently of a genetic material. In my opinion, there is no basis in known chemistry for the belief that long sequences of reactions can organize spontaneously—and every reason to believe that they cannot. The problem of achieving sufficient specificity, **whether in aqueous solution or on the surface of a mineral**, is so severe that the chance of closing a cycle of reactions as complex as the reverse citric acid cycle, for example, is negligible" (1998, 23:494-495, emp. added).

Thaxton, Bradley, and Olsen pointed out,

> "Notice, however, that the sharp edge of this critique is not what we **do not** know, but what we **do** know. Many facts have come to light in the past three decades of experimental inquiry into life's beginning. With each passing year the criticism has gotten stronger. The advance of science itself is what is challenging the notion that life arose on earth by spontaneous (in a thermodynamic sense) chemical reactions....
>
> "A major conclusion to be drawn from this work is that the undirected flow of energy through a primordial atmosphere is at present a woefully inadequate explanation for the incredible complexity associated with even simple living systems, and is probably wrong" (1984, pp. 182-186, emp. in orig.).

Evolutionist Michael Denton made matters even worse when he noted, "Considering the way the prebiotic soup is referred to in so many discussions of the origin of life as an already established reality, it

comes as something of a shock to realize that **there is absolutely no positive evidence for its existence**" (1985, p. 261, emp. added).

Perhaps this is why the "where" of origin-of-life scenarios has been the subject of so much discussion over the past twenty to twenty-five years. In fact, John Rennie, in his lengthy article defending evolution in the July 2002 issue of *Scientific American*, while admitting (as I pointed out earlier) that **"**the origin of life remains very much a mystery" (talk about an understatement!), suggested in practically the same breath,

> "…[B]iochemists have learned about how primitive nucleic acids, amino acids and other building blocks of life could have formed and organized themselves into self-replicating, self-sustaining units, laying the foundation for cellular biochemistry. Astrochemical analyses hint that quantities of these compounds might have originated in space and fallen to earth in comets, a scenario that may solve the problem of how those constituents arose under the conditions that prevailed when our planet was young" (2002, 287[1]:81).

This type of talk is becoming an all-too-familiar scenario in the evolutionary camp these days. And I can understand why. As probabilistic statistician James Coppedge (1973) has noted, even (a) postulating a primordial sea on Earth with every single component necessary for life, (b) speeding up the bonding rate so as to form different chemical combinations a trillion times more rapidly than evolutionists have hypothesized to have occurred, (c) allowing for a 4.6 billion-year-old Earth, and (d) using all atoms on Earth, that still leaves the probability of a single protein molecule being produced by chance at 1 in 10^{261}. Coppedge then estimated a probability of 1 in $10^{119,879}$ for obtaining the minimum set of the required estimate of 239 protein molecules for the smallest theoretical life form. At that rate, Coppedge estimated that it would require, on the average, $10^{119,831}$ years to obtain such a set of proteins on Earth by naturalistic evolution (pp. 110,114). In other words, this event is completely outside the range of probability. How do we know that?

One of the fundamental laws of science is the basic law of probability, developed several years ago by the renowned Swiss probabilistic statistician, Emile Borel. This law states that the occurrence of any event, where the chances are beyond one in one followed by 50 zeroes, is an event that we can state with certainty will never happen, no matter how much time is allotted, and no matter how many conceivable opportunities could exist for the event to take place (cf. Borel, *Probabilities and Life*, Dover, New York, 1962, chapters 1 & 3; see especially p. 28). It therefore is of interest to note in this context the various probabilities as suggested by some of the authors above.

Evolutionists have begun to realize (slowly and reluctantly—as continued discussions of Stanley Miller's now-discredited experiments in modern-day textbooks reveals all too well) the immense difficulty/improbability of getting life started on Earth via naturalistic processes. Therefore, many of those same evolutionists have turned to outer space for the salvation of their imperiled theory.

In an article with the intriguing title, "Cosmic Chemistry Gets Creative," in the May 19, 2001, issue of *Science News*, Jessica Gorman noted that some scientists now "…speculate that precursors to life might have arrived on an asteroid, meteorite, comet, or even interplanetary dust" (159:317). Yet such a scenario turns out to have its own set of built-in problems, as Gorman went on to note:

> "The next question is: Could those chemicals have traveled from their out-of-this-world venues to Earth's surface? No one knows if the delicate chemicals could have survived the intense heat and pressure of an arrival via comet or meteorite. Nor does anyone know how an asteroid, meteorite, or comet impact might have altered Earth's atmosphere locally, perhaps making it more friendly to life…. It may be that the best clues to life's first molecules remain out in space. Researchers can theorize with computers about impacts, simulate them in the laboratory, and test meteorites that have fallen to Earth. But they've yet to get their hands on untained, extraterrestrial samples of space stuff" (159:317).

Stanley Miller (to no one's great surprise, considering his professional stake in the matter) has vigorously defended the exact opposite view—that life **must** have evolved here on Earth rather than in space because space not only solves none of the problems associated with origin-of-life theories, but even makes matters worse as a result of the destructive cosmic rays associated with the long trip from outer space (1996). [If I may be allowed to make a personal observation here, I would like to say that it is refreshing

to see someone step forward to publicly admit that if evolutionists suggest that life evolved naturalistically in outer space or on another planet, all that accomplishes is moving the basic problem farther away rather than actually solving it. Well done, Dr. Miller!]

Harold Morowitz., in his book, *Energy Flow in Biology*, stated that the probability of the chance formation of the smallest, simplest form of living organism (anywhere) was 1 chance out of a 1 followed by 340,000,000 zeroes (1 in 1 x $10^{340,000,000}$ (1968, p. 99). The late astronomer of Cornell University, Carl Sagan, in his book, *Communications With Extra-terrestrial Intelligence*, concluded that the probability of life originating **on any planet** would be one chance in one followed by **two billion** zeroes (1 in 1 x $10^{2,000,000,000}$). A number that large would require more than **6,000 books** of over **300** pages each just to write the zeroes (1973, p. 46).

Additional problems with such an outer space scenario have to do with the extreme cold, the great distances involved in such travel, and the heat and shock associated with entering the Earth's atmosphere. Russell Grigg pointed out two additional obstacles, which are significant in their own right.

> "1. The need to achieve escape velocity. For a rock (or a spacecraft) to break free from the pull of gravity of its mother planet, it must achieve a speed called the escape velocity. For earth this is 11.2 km per second…(25,000 mph). As volcanoes do not eject materials at these speeds, scientists postulate that rocks are blasted from planets into space through giant asteroid collisions.
>
> "2. The tyranny of distance. The **nearest** star to Earth is Proxima Centauri. It is 4.3 light years away…. If a planet was orbiting Proxima Centauri and a rock was blasted from it at the speed of earth's escape velocity, the object would take 115,000 years to get here. Any rock coming from an Earth-sized planet at the comparatively close distance of 40 light years away (or $1/2500^{th}$ of the diameter of the Milky Way) would take over a million years to get here" (2000, 22[4]:42, emp. in orig.).

All other stars, and any planets possibly associated with them, are even farther away. The temperature during such hypothetical trips would be near absolute zero, and constant bombardment by cosmic rays would significantly worsen the situation. Are such problems somehow lessened by the suggestion that "only" the "raw materials" (such as amino acids) might have made the trip successfully? No, they are not. In his book, *How Life Began*, Thomas F. Heinze addressed this point.

> "At this time, any appeal to life having started somewhere else is another way of saying, 'Once upon a time, far, far away!' Some who now recognize this fact claim that rather than life coming from outer space, only the raw materials, from which life could be made, came. Some even cite a slightly higher ratio of left-handed amino acids on a few meteorites. When you read their statements, remember that living things do not just require that more than half of their amino acids be left-handed. They must **all** be left-handed. In addition, the correct raw materials have been purchased in chemical supply stores, and put together in laboratories. They don't form life. **If all left-handed amino acids could be found in space, they would be stuck with the same problems that caused people to look to space in the first place: Amino acids would return to half left- and half-right handed**. Other materials necessary for life would break down, and for reasons we have already examined, no DNA, RNA, lipids, or proteins would form" (p. 131, emp. added).

Thus, when all is said and done, evolutionists find themselves right back where they started more than fifty years ago—with no adequate explanation for the naturalistic origin of life on Earth. As Lahav put it,

> "Soon after the Miller-Urey experiment, many scientists entertained the belief that the main obstacles in the problem of the origin of life would be overcome within the foreseeable future. But as the search in this young scientific field went on and diversified, it became more and more evident that the problem of the origin of life is far from trivial. Various fundamental problems facing workers in this search gradually emerged, and new questions came into focus ... Despite intensive research, most of these problems have remained unsolved. Indeed, during the long history of the search into the origin of life, controversy is probably the most characteristic attribute of this interdisciplinary field. There is hardly a model or scenario or fashion in this discipline that is not controversial" (Lahav, 1999, p. 50).

Now perhaps you better understand what I meant when I said at the beginning of this section on the naturalistic origin of life that, in certain instances, an unbiased observer might justifiably draw the conclu-

sion that the number of things that are unknown or unknowable actually outweigh the number that are known, or why it so often appears that theories increasingly eclipse facts, problems greatly exceed solutions, questions vastly outnumber answers, doubts routinely overshadow certainties, and little is what it seems. In fact, along that line I find it interesting that when physicist Paul Davies decided that he wanted to write a book on the origin of life, he said that at first he "was convinced that science was close to wrapping up the mystery of life's origins," but after spending "a year or two researching the field" he was "of the opinion that there remains a huge gulf in our understanding.... This gulf in understanding is not merely ignorance about certain technical details, it is a major conceptual lacuna [an empty space where something is missing]" (1999, p. 17). Three years later Davies lamented,

> "Nobody knows how, or precisely when, life began. Somehow a mixture of lifeless chemicals became a primitive living thing. This is unlikely to have happened in a single dramatic leap; doubtless there was a long and complicated sequence of physical processes. It is sometimes claimed that life is written into the laws of physics. Although it is true that life would probably be impossible if the laws had been slightly different, **there is nothing in the known laws to compel matter to organise into life**. If a 'life principle' exists in nature, it will be found not in basic physical laws but in areas such as complexity and information theory. After all, **the living cell is not some sort of magic matter, but a highly complex information processing and replicating system**" (2002, 175[2361]:33, emp. added).

Do not miss two important points tucked away in Dr. Davies' comments. First, notice his statement that "there is nothing in the known laws to compel matter to organise into life." And second, notice his reference to the fact that if a solution to the problem of the naturalistic origin of life is going to be found, it will be found "in areas such as complexity and information theory."

I find Davies' reference to information theory intriguing because one eminent information-theory researcher, Hubert Yockey, had stated several years earlier, "One must conclude that, contrary to the established and current wisdom, a scenario describing the genesis of life on earth by chance and natural causes which can be accepted on the basis of fact and not faith has not yet been written" (1977, 67:398). In the rebuttal I prepared to my evolutionary colleague's alleged proofs of evolution, I addressed the fact that scientific studies have shown that the hereditary information contained in the code found within the nucleus of the living cell is universal in nature. Regardless of scientists' respective views on origins, every scientist acknowledges this. Evolutionist Richard Dawkins observed, "The genetic code is universal.... The complete word-for-word universality of the genetic dictionary is, for the taxonomist, too much of a good thing" (1986, p. 270). Darrel Kautz agreed when he wrote, "It is recognized by molecular biologists that the genetic code is universal, irrespective of how different living things are in their external appearances" (1988, p. 44).

It is the genetic code which ensures that living things reproduce faithfully, exactly as the principles of genetics state that they should. Such faithful reproduction, of course, is due both to the intricate design and the immense complexity (i.e., the information contained within) that code. It is doubtful that anyone cognizant of the facts would speak of the "simple" genetic code. A.G. Cairns-Smith has explained why:

> "Every organism has in it a store of what is called **genetic information**.... I will refer to an organism's genetic information store as its **Library**.... Where is the Library in such a multicellular organism? The answer is everywhere. With a few exceptions, every cell in a multicellular organism has a complete set of all the books in the Library. As such an organism grows, its cells multiply and in the process the complete central Library gets copied again and again.... The human Library has 46 of these cord-like books in it. They are called chromosomes. They are not all of the same size, but an average one has the equivalent of about 20,000 pages.... Man's Library, for example, consists of a set of construction and service manuals that run to the equivalent of about a million book-pages together" (1985, pp. 9,10, emp. in orig.).

Wilder-Smith concurred with such an assessment when he wrote,

> "Now, when we are confronted with the genetic code, we are astounded at once at its simplicity, complexity and the mass of information contained in it. One cannot avoid being awed at the sheer density of information contained in such a miniaturized space. When one considers that the entire chemical information required to construct a man, elephant, frog, or an orchid was compressed into two minuscule reproductive cells, one can only be astounded. **Only a sub-human could not be astounded**. The almost in-

> conceivably complex information needed to synthesize a man, plant, or a crocodile from air, sunlight, organic substances, carbon dioxide and minerals is contained in these two tiny cells. If one were to request an engineer to accomplish this feat of information miniaturization, one would be considered fit for the psychiatric line" (1976, pp. 257-259, emp. in orig.).

It is no less amazing to learn that even what some would call "simple" cells (e.g., bacteria) have extremely large and complex "libraries" of genetic information stored within them. For example, the bacterium *Escherichia coli*, which is by no means the "simplest" cell known, is a tiny rod only a thousandth of a millimeter across and about twice as long, yet "it is an indication of the sheer complexity of *E. coli* that its Library runs to a thousand page-equivalent" (Cairns-Smith, p. 11).

In the section he authored on the topic of "life" for the *Encyclopaedia Britannica*, Carl Sagan observed that a single human being is composed of what he referred to as an "ambulatory collection of 10^{14} cells" (1997, 22:965). He then noted, "The information content of a simple cell has been established as around 10^{12} bits, comparable to about a hundred million pages of the *Encyclopaedia* Britannica" (p. 966). Dr. Sagan estimated that if a person were to count every letter in every word in every book of the world's largest library (approximately 10 million volumes), the total number of letters would be 10^{12}, which suggests that **the "simple cell" contains the information equivalent of the world's largest library** (1974, 10:894)! Richard Dawkins acknowledged that the cell's nucleus "contains a digitally coded database larger, in information content, than all 30 volumes of the *Encyclopaedia Britannica* put together. And this figure is for **each** cell, not all the cells of a body put together" (1986, pp. 17-18, emp. in orig.).

Some evolutionists, of course, are convinced that, to use the words of Harvard's Nobel laureate, George Wald,

> "The important point is that since the origin of life belongs in the category of at-least-once phenomena, time is on its side. However improbable we regard this event, or any of the steps which it involves, given enough time it will almost certainly happen at lest once. And for life as we know it, with its capacity for growth and reproduction, once may be enough. **Time is in fact the hero of the plot**. The time with which we have to deal is of the order of two billion years [the current estimate of the age of the Earth in the 1950s]. What we regard as impossible on the basis of human experience is meaningless here. Given so much time, the 'impossible' becomes possible, the possible probable, and the probable virtually certain. **One has only to wait; time itself performs the miracles**" (1954, 191[2]:48, emp. added).

Other well-known evolutionary scientists have echoed the same sentiments. Harold Blum, writing in *Time's Arrow and Evolution*, remarked, "The origin of life can be viewed properly only in the perspective of an almost inconceivable extent of time" (1968, p. 151). Leo Koch, in an article he authored for *Scientific Monthly*, commented that, given enough time, "...the highly improbable occurs regularly, and indeed is inevitable" (1957, p. 250). Or, as Keosian observed, "The mechanists were not discouraged by the enormous span of time required for this chance event. They point out that, given enough time, the most improbable event becomes a statistical certainty" (1968, p. 10). Richard Dawkins boasted,

> "Given infinite time, or infinite opportunities, anything is possible….However improbable a large-scale change may be, smaller changes are less improbable. And provided we postulate a sufficiently large series of sufficiently finely graded intermediates, we shall be able to derive anything from anything else, without invoking astronomical probabilities. We are allowed to do this only if there has been sufficient time to fill all the intermediates in. And also only if there is a mechanism for guiding each step in some particular direction, otherwise the sequence of steps will career off in an endless random walk" (1986, pp. 139,317-318).

For evolutionists, "Father Time" and "Mother Nature" apparently are more than capable of, as Wald put it, "performing miracles." In fact, Nobel laureate Jacques Monod stated the matter quite succinctly when he wrote, "**Chance alone is the source of every innovation, of all creation in the biosphere.... All forms of life are the product of chance...**" (1972, pp. 110,167, emp. added). Such a materialistic, reductionist view, however, ascribes to "chance" properties that it does not, and cannot, possess. Sproul, Gerstner, and Lindsley addressed this logical fallacy when they wrote,

> "Chance is incapable of creating a single molecule, let alone an entire universe. Why not? Chance is no thing. It is not an entity. It has no being, no power, no force. It can effect nothing, for it has no causal

power within it" (1984, p. 118).

Chance cannot create. And it certainly cannot create something as complex as the genetic code. Furthermore, as science writer Matt Ridley observed, "DNA is information, a message written in a code of chemicals" (1999, p. 13). And, as information scientist Werner Gitt correctly noted, "Coding systems are not created arbitrarily, but they are optimized according to criteria.... Devising a code is a **creative mental process**. Matter can be a **carrier** of codes, but it cannot **generate** codes" (1997, pp. 59,67, emp. added). Whence, then, have come life and its dazzlingly complex, incredibly complicated genetic code? What "creative mental process" imposed the information on it that it contains? Evolutionists Robert Augros and George Stanciu wrote in their textbook, *The New Biology*,

> "What cause is responsible for the origin of the genetic code and directs it to produce animal and plant species? It cannot be matter because of itself matter has no inclination to these forms.... **There must be a cause apart from matter** that is able to shape and direct matter. Is there anything in our experience like this? Yes, there is: our own minds. The statue's form originates in the mind of the artist, who then subsequently shapes matter, in the appropriate way.... **For the same reasons there must be a mind that directs and shapes matter in organic forms**" (1987, p. 191, emp. added).

In spite of the overwhelming empirical and probabilistic evidence that life as we know it could not have originated by chance, naturalistic processes, evolutionists nevertheless possess an unwavering belief that that is exactly what **did** happen—and that someday they will be able to provide answer as to exactly how life **could** have spontaneously generated itself. For now, however, "here in the real world," I cannot help but inquire: If, as the evidence currently indicates, the naturalistic beginnings of life both **on Earth** and **in outer space** are improbable and impossible, what's left? Robert Jastrow summarized the matter quite well when he said,

> "At present, science has no satisfactory answer to the question of the origin of life on the earth. Perhaps the appearance of life on the earth is a miracle. Scientists are reluctant to accept that view, but their choices are limited: **either** life was created on the earth by the will of a being outside the grasp of scientific understanding, or it evolved on our planet spontaneously, through chemical reactions occurring in nonliving matter lying on the surface of the planet. The first theory places the question of the origin of life beyond the reach of scientific inquiry. It is a statement of faith in the power of a Supreme Being not subject to the laws of science. The second theory is also an act of faith. The act of faith consists in assuming that the scientific view of the origin of life is correct, without having concrete evidence to support that belief" (1977, p. 62, emp. in orig.).

Abiogenesis is just one area of scientific research which illustrates all too well that the naturalistic origin-of-life hypothesis has become as implausible as it is improbable. Moreover, various scientists involved in origin-of-life research now have begun to lament the fact that molecular biology also has been extremely unkind to naturalistic origin-of-life theories. All in all, perhaps George Kerkut said it best when, after listing the seven non-provable assumptions of evolution, he ended by saying, "The first point that I should like to make is that these seven assumptions by their nature **are not capable of experimental verification**" (1960, p. 7, emp. added). As any first-year logic student will tell you, something based on an assumption is neither provable nor factual since, by its very nature, its foundation is a mere assumption. In the case of organic evolution, the foundation is not merely **one** assumption, but **seven** (none of which, as Kerkut reminded us, is "capable of experimental verification). What does that tell you about the alleged factuality of evolution?

NON-EVOLUTIONIST'S THIRD AFFIRMATIVE: THE MYSTERY OF THE ORIGIN OF GENDER AND SEXUAL REPRODUCTION — EVOLUTION'S "QUEEN OF PROBLEMS" —

The world around us is literally teeming with living organisms that range in size from nano-size microorganisms to gargantuan blue whales. But how did everything get here? One of the first thoughtful (but not always appreciated!) questions that children often ask their parents is, "Where did I come from?" When an evolutionist answers this question, he is likely to point to fragments from the fossil record and

declare that humans descended from an ancient ape-like ancestor. However, one of the most-glaring failures of this alleged lineage is its inability to account for the origin of sexual (as opposed to asexual) reproduction, and the existence of a male and female within each species that reproduces sexually.

Biology textbooks are quick to illustrate amoebas evolving into intermediate organisms, which then conveniently give rise to amphibians, reptiles, mammals, and, eventually, humans. Yet, interestingly, students never learn exactly when (or how!) independent male and female species developed. Somewhere along this evolutionary path, both males and females were required in order to permit the procreation that was necessary to further the existence of a particular species. But how do evolutionists explain this? When pressed to answer questions like, "Whence have males and females actually come?," or "What is the evolutionary origin of sex?," evolutionists become as silent as the tomb in which they have laid this problem. How is it that at one point in time, "nature" was able to evolve a female member of a species that produces eggs and is internally equipped to nourish a growing embryo, while at the same time evolving a male member that produces motile sperm cells? And, further, how is it that these gametes (eggs and sperm) "conveniently" evolved so that they each contain **half** the normal chromosome number of somatic (body) cells? [Somatic cells reproduce via the process of **mitosis**, which maintains the species' standard chromosome number; gametes are produced via the process of **meiosis**, which halves that number. I will have more to say about both later.]

The evolution of sex (and its accompanying reproductive capability) is rarely a favorite topic of discussion in evolutionary circles, because no matter how many theories and proposals evolutionists conjure up (and there are several!), they still must surmount the enormous hurdle of explaining the origin of the first fully functional female and the first fully functional male necessary to begin the process. Graham Bell, in his book, *The Masterpiece of Nature: The Evolution of Genetics and Sexuality*, admitted that the whole problem of sexual reproduction "represents the most important challenge to the modern theory of evolution" (1982, book jacket). He then went on to describe the dilemma in the following manner:

> "**Sex is the queen of problems in evolutionary biology**. Perhaps no other natural phenomenon has aroused so much interest; certainly none has sowed as much confusion. The insights of Darwin and Mendel, which have illuminated so many mysteries, have so far failed to shed more than a dim and wavering light on the central mystery of sexuality, emphasizing its obscurity by its very isolation" (p. 19, emp. added).

The same year that Bell published his book, evolutionist Philip Kitcher noted, "Despite some ingenious suggestions by orthodox Darwinians, there is no convincing Darwinian history for the emergence of sexual reproduction" (1982, p. 54). Evolutionists since have freely admitted that the origin of gender and sexual reproduction still remains one of the most-difficult problems in biology (see, for example, Maynard-Smith, 1986, p. 35). In Mark Ridley's book, *The Cooperative Gene*, he wrote (under the chapter title of "The Ultimate Existential Absurdity"), "Evolutionary biologists are much teased for their obsession with why sex exists. People like to ask, in an amused way, 'isn't it obvious?' Joking apart, **it is far from obvious**…. **Sex is a puzzle that has not yet been solved; no one knows why it exists**" (2001, pp. 108,111, emp. added). In an article in *Bioscience* on "How Did Sex Come About?," Julie Schecter remarked,

> "Sex is ubiquitous…. Yet sex remains a mystery to researchers, to say nothing of the rest of the population. Why sex? At first blush, its disadvantages seem to outweigh its benefits. After all, a parent that reproduces sexually gives only one-half its genes to its offspring, whereas an organism that reproduces by dividing passes on all its genes. Sex also takes much longer and requires more energy than simple division. Why did a process so blatantly unprofitable to its earliest practitioners become so widespread?" (1984, 34:680).

Why sex? Why indeed?! I invite you to read further as I survey several issues concerning the origin of gender and sexual reproduction.

"Intellectual Mischief and Confusion"

The distinguished microbiologist of the University of Massachusetts at Amherst, Lynn Margulis, and her son Dorion Sagan (Ms. Margulis is one of the late Carl Sagan's former wives; Dorion is their son)

have gone on record as stating, "Many theories of sex are clearly fallacious…. Putting these ideas of sexual origins together, our hypothesis is quite different from the accepted wisdom about the role of sex in evolution" (1997, pp. 290,293). Yes, it is. To quote them directly, "…complex microscopic beings and their descendants developed the first male and female genders, and our kind of cell-fusing sexuality involving penetration of an egg by a sperm" (p. 78). Tom Wakeford addressed this unorthodox idea in his book, *Liaisons of Life*, and concluded,

> "Margulis's hypothesis for the origin of sexuality is radical. She believes that the ecological relations of ancient microbes drove a process that ultimately led to our way or reproducing. She bases this ambitious idea on a theory she published in 1967. Now classic, the theory attempted to explain the biggest missing link in evolution—the jump from bacteria (often called prokaryotes), all of which lack nuclei, to modern cells, or eukaryotes, whose cells contain nuclei.
>
> "The differences between prokaryotes and eukaryotes are so profound that they make the distinction between dinosaurs and dogs or birds and bees look negligible. Eukaryotes include animals, plants, protists, and fungi, each cell of which generally contains hundreds of times more DNA than a prokaryote.
>
> "Unlike many other transitions in evolution, there are no intermediates between eukaryotes and prokaryotes. It is as if honeybees mutated into humans without any evidence of rats, cats, or chimpanzees in between. The evolutionary processes behind this great revolution have had to be discerned without the help of one of the evolutionist's most trusted sources of evidence—the fossil record" (2001, pp. 147-148, parenthetical comment in orig.).

Perhaps it is this complete lack of evidence that has caused Margulis and Sagan to suggest that since sex is basically a historical mishap of sorts—a kind of "accidental holdover" from the era of single-celled organisms—then the maintenance of sex becomes a "nonscientific" question that "leads to intellectual mischief and confusion" (as quoted in Crow, 1988, pp. 59-60).

While there may well be many "clearly fallacious" theories regarding the **origin** of sex, and while the fact that sex exists may indeed represent to evolutionists a matter of "intellectual mischief and confusion," the **fact** of both the ubiquity and the complexity of sexual reproduction has not eluded Darwinists. Evolutionist Niles Eldredge of the American Museum of Natural History has admitted that "sex occurs in all major groups of life" (Eldredge and Cracraft, 1980, p. 102). Or as Jennifer Ackerman wrote somewhat emphatically in *Chance in the House of Fate*, "Now, it seems, nature **hurls** the sexes at each other" (2001, p. 49, emp. added).

But **why** is this the case? Evolutionists are forced to concede that there must be "some advantage" to a system as physiologically and energetically complex as sex, as Mark Ridley admitted when he wrote, "…[I]t is highly likely that sex has **some advantage**, and that the advantage is **big**. Sex would not have evolved, and been retained, unless it had some advantage" (2001, p. 254, emp. added). Yet locating and explaining that advantage seems to have eluded evolutionists. Sir John Maddox (who, as I mentioned earlier, served for over twenty-five years as the editor of *Nature*, the prestigious journal published by the British Association for the Advancement of Science, and who was knighted by Queen Elizabeth II in 1994 for his "multiple contributions to science"), authored an amazing book titled, *What Remains to be Discovered*, in which he addressed the topic of the origin of sex, and stated forthrightly,

> "The overriding question is when (and then how) sexual reproduction itself evolved. **Despite decades of speculation, we do not know**. The difficulty is that sexual reproduction creates complexity of the genome and the need for a separate mechanism for producing gametes. The metabolic cost of maintaining this system is huge, as is that of providing the organs specialized for sexual reproduction (the uterus of mammalian females, for example). What are the offsetting benefits? **The advantages of sexual reproduction are not obvious**" (1998, p. 252, parenthetical items in orig., emp. added).

The fact that the advantages of sex are "not obvious" is well known (though perhaps not often discussed) within the halls of academia. J.C. Crow lamented,

> "Sexual reproduction seems like a lot of baggage to carry along if it is functionless. Evolutionary conservatism perpetuates relics, but does it do so on such a grand scale as this?… It is difficult to see how a process as elaborate, ubiquitous, and expensive as sexual reproduction has been maintained without serving some important purpose of its own" (1988, p. 60).

What is that "purpose"? And how can evolution via natural selection explain it? Would "Nature" (notice the capital "N") "select for" sexual reproduction? As it turns out, the common Darwinian/Neo-Darwinian "survival of the fittest" mentality cannot begin to explain the high cost of first evolving, and then maintaining, the sexual apparatus. Sexual reproduction requires organisms to first produce, and then maintain, gametes (reproductive cells—i.e., sperm and eggs). Additionally, various kinds of incompatibility factors (like the blood Rh factor between mother and child) can pass along additional "costs" (some of which can be life threatening) that are inherent in this "expensive" means of reproduction. In sexual organisms, problems also can arise in regard to tissue rejection between the mother and the newly formed embryo. The human immune system is vigilant in identifying foreign tissue (such as an embryo that carries half of the male's genetic information), yet evolutionists contend that the human reproductive system has "selectively evolved" this "elaborate, ubiquitous, and expensive" method of reproduction. In trying to reconcile the logic behind what causes such things to occur via naturalistic evolution, vitalist philosopher Arthur Koestler observed,

> "Once upon a time it all looked so simple. Nature regarded the fit with the carrot of survival and punished the unfit with the stick of extinction. The trouble only started when it came to defining "fitness." …Thus natural selection looks after the survival and reproduction of the fittest, and the fittest are those which have the highest rate of reproduction—we are caught in a circular argument which completely begs the question of what makes evolution evolve" (1978, p. 170).

The question of "what makes evolution evolve" is especially critical when it comes to the origin of gender and sexual reproduction. As Dr. Maddox went on to say, "Much more must be learned of the course of evolution before it is known how (rather than why) sexual reproduction evolved…. That task will require intricate work by future generations of biologists" (1998, pp. 253,254, parenthetical item in orig.). I suggest, based on the evidence, that the intricacy, complexity, and informational content associated with sexual reproduction demand the conclusion that sex is neither a "historical accident" resulting in evolutionary baggage nor a product of organic evolution itself.

From Asexual to Sexual Reproduction—The Origin of Sex

Many single-celled organisms reproduce asexually. If we all descended from these single-celled creatures, as Margulis and Sagan have suggested, then why was the simple-yet-efficient method of asexual reproduction set aside in favor of sexual reproduction? In an intriguing article titled "The Enigma of Sex and Evolution," biologist Jerry Bergman wrote,

> "Evolution requires sexual reproduction to have evolved from asexual reproduction via natural selection…. The lack of evidence of any biological systems that can bridge the chasm between sexual and asexual reproduction either today or in the past is also a major difficulty with evolution theory. Actually, the complete lack of any transitional forms for all sexual traits is a huge major fossil gap. The same problem also exists here as with any transitional form: structures are useless or worse until they are at least marginally functional. This is **especially** true regarding reproduction, and would result in rapid extinction if the features produced by mutations were less than fully functional" (1996, 33:230, emp. in orig.).

Dobzhansky and his co-authors commented on this "enigma" in their book, *Evolution*:

> "With respect to the origin of sexual reproduction, two challenging questions present themselves. First, in what kinds of organisms did sex first arise? And second, what was the adaptive advantage that caused sexual reproduction to become predominant in higher organisms?" (1977, p. 391)

Asexual reproduction is the formation of new individuals from cells of only one parent, without gamete formation or fertilization by another member of the species. Asexual reproduction thus does not require one egg-producing parent and one sperm-producing parent. A single parent is all that is required. In addressing this point, evolutionist George C. Williams admitted that the "immediate advantage of asexual reproduction is generally conceded by all those who have seriously concerned themselves with the problem" (1977, p. 8). In fact, he went on to note that "the masculine-feminine contrast is a *prima facie* difficulty for evolutionary theory" (p. 124).

Sporulation (spore formation) is one method of asexual reproduction among protozoa and certain plants. A spore is a reproductive cell that produces a new organism without fertilization. In some lower forms of animals (e.g., hydra), and in yeasts, **budding** is a common form of asexual reproduction as a small protuberance on the surface of the parent cell increases in size until a wall forms to separate the new individual (the bud) from the parent. **Regeneration** is another specialized form of asexual reproduction that allows some organisms (e.g. starfish and salamanders) to replace injured or lost parts. All of these processes require only one "parent," and work quite well in stable environments.

As evolutionists have struggled to explain the existence of **sexual** reproduction in nature, they have suggested four different (and sometimes contradictory) theories, known in the literature as: (1) the Lottery Principle; (2) the Tangled Bank Hypothesis; (3) the Red Queen Hypothesis; and (4) the DNA Repair Hypothesis. I would like to discuss each briefly here.

The Lottery Principle

The Lottery Principle was first suggested by American biologist George C. Williams in his monograph, *Sex and Evolution* (1975). Williams' idea was that sexual reproduction introduced genetic variety in order to enable genes to survive in changing or novel environments. He used the lottery analogy to get across the concept that breeding **asexually** would be like buying a large number of tickets for a national lottery but giving them all the same number; **sexual** reproduction would be like purchasing few tickets, but giving each of them a different number. The essential idea behind the Lottery Principle is that since sex introduces variability, organisms would have a much better chance of producing offspring that will survive if they produced a **range** of types rather than just more of the same.

The point being made by those who hold to the Lottery Principle is that asexual reproduction is, in fact, poorly equipped to adapt to rapidly changing environmental conditions, due to the fact that the offspring are exact copies (i.e., clones) of their parents, and thus inherently possess less genetic variation, which ultimately could lead to improved adaptability and a greater likelihood of survival. As Carl Zimmer wrote under the chapter title of "Evolution from Within" in his book, *Parasite Rex*, "A line of clones might do well enough in a forest, but what if that forest changed over a few centuries to a prairie? Sex brought the variations that could allow organisms to survive change" (2000, p. 163). Matt Ridley added,

> "…[A] sexual form of life will reproduce at only half the rate of an equivalent clonal form. The halved reproductive rate of sexual forms is probably made up for by a **difference in quality: the average sexual offspring is probably twice as good as an equivalent cloned offspring**" (1993, p. 254, emp. added).

It would be "twice as good," of course, because it had twice the genetic endowment (having received half from each of the two parents). Reichenbach and Anderson summarized the issue as follows:

> "For example, why do most animals reproduce sexually rather than asexually, when asexual reproduction seems to conform best to the current theory that in natural selection the fittest are those that preserve their genes by passing them on to their progeny? One theory is that sexual reproduction provides the best defense against the rapidly reproducing, infectious species that threaten the existence of organisms. The **diversity in the species** that results from combining different gene pools favors the survival of those that are sexually reproduced over those that by cloning inherit repetitive genetic similarity" (1995, p. 18, emp. added).

It is that "diversity in the species," according to the principle, which helps an organism maintain its competitive edge in nature's struggle of "survival of the fittest." But of late, the Lottery Principle has fallen on hard times. It suggests that sex would be favored by a **variable** environment, yet a close inspection of the global distribution of sex reveals that where environments are **stable** (such as in the tropics), **sexual** reproduction is most common. In contrast, in areas where the environment is **unstable** (such as at high altitudes or in small bodies of water), **asexual** reproduction is rife. Thus, few evolutionists today are willing to advocate or defend the Lottery Principle.

The Tangled Bank Hypothesis

The Tangled Bank Hypothesis suggests that sex evolved in order to prepare offspring for the complicated world around them. The "tangled bank" phraseology comes from the last paragraph of Darwin's

Origin of Species in which he referred to a wide assortment of creatures all competing for light and food on a "tangled bank." According to this concept, in any environment where there is intense competition for space, food, and other resources, a premium is placed on diversification. As Zimmer described it,

> "In any environment—a tidal flat, a forest canopy, a deep-sea hydrothermal vent—the space is divided into different niches where different skills are needed for survival. A clone specialized for one niche can give birth only to offspring that can also handle the same niche. But sex shuffles the genetic deck and deals the offspring different hands. It's basically spreading out progeny so that they're using different resources" (2000, p. 163).

However, the Tangled Bank Hypothesis also has fallen on hard times. John Cartwright concluded in his book, *Evolution and Human Behavior*,

> "Although once popular, the tangled bank hypothesis now seems to face many problems, and former adherents are falling away. The theory would predict a greater interest in sex among animals that produce lots of small offspring that compete with each other. In fact, sex is invariably associated with organisms that produce a few large offspring, whereas organisms producing small offspring frequently engage in parthenogenesis [asexual reproduction]. In addition, **the evidence from fossils suggests that species go for vast periods of time without changing much**" (2000, p. 96, emp. and bracketed item added).

Indeed, the evidence **does** suggest "that species go for vast periods of time without changing much." Consider the following admission in light of that point. According to Margulis and Sagan, bacteria "evolved" in such a fashion as to ultimately be responsible for sexual reproduction. Yet if that is the case, why, then, have the bacteria themselves remained virtually unchanged—from an evolutionary viewpoint—for billions of years of Earth history? In his classic text, *Evolution of Living Organisms*, French zoologist Pierre-Paul Grassé raised this very point.

> "**[B]acteria**, despite their great production of intraspecific varieties, **exhibit a great fidelity to their species**. The bacillus *Escherichia coli*, whose mutants have been studied very carefully, is the best example. **The reader will agree that it is surprising, to say the least, to want to prove evolution and to discover its mechanisms, and then to choose as a material for this study a being which practically stabilized a billion years ago**" (1977, p. 87, emp. added).

Additionally, it should be noted that today we still see organisms that reproduce asexually, as well as organisms that reproduce sexually—which raises the obvious question: Why do some organisms continue to reproduce asexually, while others have "evolved" the ability to reproduce sexually? Don't the asexual organisms ever "need" genetic variety in order to enable genes to survive in changing or novel environments (the Lottery Principle)? Don't they ever "need" to prepare their offspring for the complicated world around them (the Tangled Bank Hypothesis)?

The Red Queen Hypothesis

The Red Queen Hypothesis was first suggested by Leigh Van Valen in an article titled "A New Evolutionary Law" in *Evolutionary Theory* (1973). His research suggested that the probability of organisms becoming extinct bears no relationship to how long they already may have survived. In other words, as Cartwright put it, "It is a sobering thought that the struggle for existence never gets any easier; however well adapted an animal may become, it still has the same chance of extinction as a newly formed species" (p. 97). Biologists came to refer to the concept as the Red Queen Hypothesis, named after the character in Lewis Carroll's *Through the Looking Glass* who took Alice on a long run that actually went nowhere. As the queen said to poor Alice, "Now, **here**, you see, it takes all the running **you** can do, to keep in the same place." Think of it as a "genetics arms race" in which an animal constantly must run the genetic gauntlet of being able to chase its prey, elude predators, and resist infection from disease-causing organisms. In the world of the Red Queen, organisms have to run fast—**just to stay still!** That is to say, they constantly have to "run to try to improve" (and the development of sex would be one way of accomplishing that). Yet doing so provides no automatic guarantee of winning the struggle known as "survival of the fittest." "Nature," said British poet Alfred Lord Tennyson, is "red in tooth and claw." Currently, the Red Queen

Hypothesis seems to be the favorite of evolutionists worldwide in attempting to explain the reason as to the "why" of sex.

The DNA Repair Hypothesis

Think about it. Why are babies born young? Stupid question—with a self-evident answer, right? Evolutionists suggest otherwise. The point of the question is this. Our somatic (body) cells age. Yet cells of a newborn have had their clocks "set back." Somatic cells die, but the germ line seems to be practically immortal. Why is this the case? How can "old" people produce "young" babies? In a landmark article published in 1989, Bernstein, Hopf, and Michod suggested that they had discovered the answer: "We argue that the lack of ageing of the germ line results mainly from repair of the genetic material by meiotic recombination during the formation of germ cells. Thus our basic hypothesis is that the primary function of sex is to repair the genetic material of the germ line" (p. 4).

DNA can be damaged in at least two ways. First, ionizing radiation or mutagenic chemicals can alter the genetic code. Or, second, a mutation can occur via errors during the replication process itself. Most mutations are deleterious (see Cartwright, 2000, p. 98). In an asexual organism, by definition, any mutation that occurs in one generation will automatically be passed on to the next. Matt Ridley, in his book, *The Red Queen* (1993), compared this to what occurs when you photocopy a document, then photocopy the photocopy, and then photocopy that photocopy, etc. Eventually, the quality deteriorates severely. Asexual organisms, as they continue to accumulate mutations, face the unpleasant prospect of eventually becoming both unable to reproduce and unviable—neither of which would be at all helpful to evolution.

But if sex "evolved," it would help solve this problem, since mutations, although they might still be passed on from one generation to the next, would not necessarily be **expressed** in the next generation since a mutation has to appear in the genes of both parents before it is expressed in the offspring. As Cartwright put it,

> "In sexually reproducing species on the other hand, some individuals will be "unlucky" and have a greater share than average of deleterious mutations in their genome, and some will be "lucky," with a smaller share. The unlucky ones will be selected out. This in the long term has the effect of constantly weeding out harmful mutations through the death of those that bear them. Deleterious mutations…would have devastating consequences if it were not for sexual reproduction" (p. 99).

In his book, *The Language of Genes*, Steve Jones claimed that sex exists because

> "…if a sexless organism has a harmful change to the DNA, it will be carried by all her descendants. None of them can ever get rid of it, however destructive it might be, unless it is reversed by another change in the same gene—which is unlikely to happen. In time, another damaging error will occur in a different gene in the family line. A decay of the genetic message will set in as one generation succeeds another, just like the decay that takes place within our aging bodies as our cells divide without benefit of sex. In a sexual creature the new mutation can be purged as it passes to some descendant but not others" (1993, p. 86).

But, as Bergman correctly pointed out,

> "The problem with this conclusion is that a harmful or lethal mutation causes the entire line to die out, purging it forever form the population while millions of other lines carry on. With sex, because most mutations are recessive, many mutations that are not lethal are spread to the race in general. Problems result **only** if the same defect is inherited from both parents; thus, the harmful traits can accumulate in the race. With asexual animals the weaker lines are rapidly selected out, often in one generation" (1996, 33:221, emp. in orig.).

It is clear, therefore, as Cartwright admitted in regard to the DNA repair hypothesis, that "this theory is not without its problems and critics" (p. 99). One of those problems, expressed by Mark Ridley (no kin to Matt), is, "**We do not know for sure that sex exists to purge bad genes**" (2001, p. 254, emp. added). No, we certainly do not. And, in fact, evidence is beginning to mount that perhaps the DNA Repair Hypothesis is itself in need of "repair." As Sir John Maddox noted,

> "One view is that sexual reproduction makes it easier for an evolving organism to get rid of deleterious changes. That should certainly be the case if there is more than one genetic change and if their combined

> effect on the fitness of the evolving organisms is greater than the sum of their individual changes acting separately. **But there is no direct evidence to show that this rule is generally applicable.** Indeed, a recent experiment with the bacterium *E. coli* suggests otherwise" (1998, p. 252, emp. added).

We should not overlook an important fact throughout all of this: These theories valiantly attempt to explain why sex **exists now**, but they do not explain **the origin** of sex. How, exactly, did nature accomplish the "invention" of the marvelous process we know as sex? In addressing this very issue, Maddox asked quizzically, "How did this process (and its complexities) **evolve**?… The dilemma is that **natural selection cannot anticipate changes in the environment**, and so arrange for the development of specialized sexual organs as a safeguard against environmental change" (p. 253, parenthetical item in orig., emp. added). My point exactly! It is one thing to develop a theory or hypothesis to explain something that **already exists**, but entirely another to develop a theory of hypothesis to explain **why** that something (in this case, sex) **does exist**. As Mark Ridley begrudgingly admitted,

> "Sex is not used simply for want of an alternative. Nothing, in an evolutionary sense, **forces** organisms to reproduce sexually. Indeed, the majority of live reproduction on Earth is probably not sexual. Microbes, such as bacteria, do most of the reproduction on this planet, and they usually do it by doubling their cellular contents and then dividing from one cell to two, without any genetic input from another cell" (2001, p. 109, emp. added).

Perhaps Cartwright summarized the issue well when he said, "There is perhaps no single explanation for the maintenance of sex in the face of severe cost" (p. 99). Since he is speaking of a strictly naturalistic explanation, I would agree wholeheartedly. But I would go even farther to state that there is no purely naturalistic explanation **at all** for the origin **or** the maintenance of sex.

Why Sex?

Why does sex exist at all? Carl Zimmer, in his book, *Evolution: The Triumph of an Idea*, admitted,

> "Sex is not only unnecessary, but **it ought to be a recipe for evolutionary disaster**. For one thing, it is an inefficient way to reproduce…. And sex carries other costs as well…. By all rights, any group of animals that evolves sexual reproduction should be promptly outcompeted by nonsexual ones. **And yet sex reigns**. ...Why is sex a success, despite all its disadvantages?" (2001, pp. 230,231, emp. added).

From an evolutionary viewpoint, sex is indeed "an inefficient way to reproduce." As George Williams noted, the task of determining why sexual reproduction evolved seems "immensely difficult…because we can immediately see an enormous disadvantage in sexual reproduction" (1977, pp. 155,169). The brief reproduction period involved with, and few offspring produced by, sexual reproduction produce such clear disadvantages that Princeton's famed biologist, John Tyler Bonner, asked, "What use is sex" to evolution, and why would it evolve? (1958, p. 193; cf. also Maynard-Smith, 1971).

Think for a moment about some of the events that had to occur before sexual reproduction could "evolve."

- First, two physically distinct sexes, male and female, had to materialize (Crook, 1972, pp. 233-235).
- Second, the male and female had to "appear at the same time and in the same breeding community" (Sheppard, 1963, p. 239).
- Third, sperm production in the male, and egg production in the female, had to evolve.
- Fourth, the female had to evolve a structure (e.g., a uterus) capable of carrying the unborn until birth.
- Fifth, nature had to come up with a process by which the information carried within the DNA could be reproduced faithfully time and time again.

It is the complexity of this process, and the manner in which it is copied from generation to generation, which drove Mark Ridley practically to distraction in *The Cooperative Gene*.

> "The purpose of life is to copy DNA or, to be more exact, information in the form of DNA. Information

> copying, or information transfer, is a familiar enough activity to us in human culture. We do it all the time…. Human beings have invented an extraordinary range of media for transmitting, or copying, information. But I can tell you one thing about all these media. When humans set themselves to the task of copying information, they do just that: they copy it. In biological terms, clonal reproduction (or virgin birth) is the analogy for the way humans transmit information. No one in human culture would try the trick of first making two copies of a message, then breaking each into short bits at random, combining equal amounts from the two to form the version to be transmitted, and throwing the unused half away. **You only have to think of sex to see how absurd it is**. The 'sexual' method of reading a book would be to buy two copies, rip the pages out, and make a new copy by combining half the pages from one and half from the other, tossing a coin at each page to decide which original to take the page from and which to throw away. To watch a play, you would go twice, pre-programmed to pay attention to the first performance at one random set of times, amounting to half the total length, and to pay attention to the second performance at the complementary other half set of times" (2001, pp. 108-109, emp. added).

Again, from an evolutionary viewpoint, sex would be considered "absurd." But from a **design** viewpoint, it is nothing short of incredible!

Yet there is an even more important question than **why** sex exists. That question is this: **How** did sex **come to exist**? Evolution is dependent on change (our English word "evolution" derives from the Latin *evolvere*, meaning "to unroll; to change"). Quite obviously, if everything remained the same, there would be no evolution. Evolutionists believe that the driving forces behind evolution are genetic mutations and natural selection occurring over lengthy spans of geologic time (as Peter Ward put it in his 2001 book, *Future Evolution*, "Evolution takes time," p. 153). Mutations are primarily the result of **mistakes** that occur during DNA replication. There are three different types of mutations: beneficial, deleterious, and neutral (see Mayr, 2001, p. 98). Neutral mutations, while admittedly frequent, are, as their name implies, "neutral." They do not propel evolution forward in any significant fashion. Deleterious mutations "will be selected against and will be eliminated in due time" (Mayr, p. 98). That, then, leaves beneficial mutations, which, according to evolutionists, are incorporated into the species by natural selection, eventually resulting in new and different organisms.

But what does all of this have to do with the origin of sex? Evolutionists adhere to the view that the first organisms on Earth were **asexual**, and thus they believe that, during billions of years of Earth history, asexual organisms experienced numerous beneficial mutations that caused them to evolve into **sexual** organisms. But the change of a single-celled, asexual prokaryote (like a bacterium) into a multi-celled, sexual eukaryote would not be a "magical" process carried out by just a few, well-chosen beneficial mutations (as if nature had the power to "choose" anything!). In fact, quite the opposite would be true. Why so? Ernst Mayr, who probably was considered at the time of his death to be the most-eminent evolutionary taxonomist in the world, commented in his book, *What Evolution Is*, "Any mutation that induces changes in the phenotype [the outward, physical make-up of an organism] will either be favored or discriminated against by natural selection…. **[T]he occurrence of new beneficial mutations is rather rare**" (p. 98, emp. and bracketed material added). Beneficial mutations (viz., those that provide additional information for, and instructions to, the organism) are indeed "rather rare." Furthermore, as evolutionists candidly admit, mutations that affect the phenotype almost always are **harmful** (Crow, 1997; Cartwright, 2000, p. 98). Stanford University geneticist Luigi Cavalli-Sforza, head of the international human genome diversity project, addressed this fact when he wrote, "Genetic mutations are spontaneous, chance changes, which are rarely beneficial, and more often have no effect, or a deleterious one" (2000, p. 176). In addressing the complete ineffectiveness of mutations as an alleged evolutionary mechanism, Grassé observed,

> "Some contemporary biologists, as soon as they observe a mutation, talk about evolution. They are implicitly supporting the following syllogism (argument): mutations are the only evolutionary variations, all living beings undergo mutations, therefore all living beings evolve. This logical scheme is, however unacceptable: first, because its major premise is neither obvious nor general; second, because its conclusion does not agree with the facts. **No matter how numerous they may be, mutations do not produce any kind of evolution**…. The opportune appearance of mutations permitting animals and plants to meet their needs seems hard to believe. Yet the Darwinian theory is even more demanding: a single plant, a single

> animal would require thousands and thousands of lucky, appropriate events. Thus, miracles would become the rule: events with an infinitesimal probability could not fail to occur…. There is no law against daydreaming, but science must not indulge in it" (1977, pp. 88,103,107, parenthetical item in orig., emp. added).

Grassé is not the only prominent evolutionist to take such a view in regard to mutations as an ineffectual driving force for evolution. In a speech that he presented at Hobart College several years ago, the late Harvard paleontologist Stephen J. Gould spoke out in a somewhat militant fashion about the subject when he said, "A mutation doesn't produce major new raw material. You don't make a new species by mutating the species.... That's a common idea people have; that evolution is due to random mutations. A mutation is **not** the cause of evolutionary change" (1984, p. 106, emp. in orig.). [All of this raises the question: If mutations are **not** the cause of evolutionary change, then what is?]

There is more to the problem of the origin of sex, however, than "just" the fact of rare, beneficial mutations and their much-more-frequent cousins, the harmful, deleterious mutations. There is the added problem related to the two different types of cell division I mentioned earlier—mitosis and meiosis. During mitosis, **all** of the chromosomes are copied and passed on from the parent cell to the daughter cells. Meiosis (from the Greek meaning to split), on the other hand, occurs only in sex cells (eggs and sperm); during this type of replication, **only half** of the chromosomal material is copied and passed on. [For an excellent, up-to-date description of the intricate, complicated, two-part process by which meiosis occurs, see Mayr, 2001, p. 103.] Once meiosis takes place, "the result is the production of completely new combinations of the parental genes, all of them uniquely different genotypes [the genetic identity of an individual that does not show as outward characteristics]. These, in turn, produce unique phenotypes, **providing unlimited new material** for the process of natural selection" (Mayr, p. 104, emp. and bracketed material added).

It is those very facts—that meiosis allegedly has "evolved" the ability to halve the chromosome number (but only for gametes), **and** that it actually can provide "unlimited new material"—which make the meiotic process so incredible. And the critical importance of meiosis to life as we know it has been acknowledged (albeit perhaps begrudgingly) even by evolutionists. Margulis and Sagan, for example, wrote,

> "We think that meiosis became tied to two-parent sex and that meiosis as a cell process, rather than two-parent sex, was a prerequisite for evolution of many aspects of animals…. [M]eiosis seems intimately connected with complex cell and tissue differentiation. After all, animals and plants return every generation to a single nucleated cell. We believe that meiosis, especially the chromosomal DNA-alignment process in prophase, is sort of like a roll call, ensuring that sets of genes, including mitochondrial and plastid genes, are in order before the multicellular unfolding that is the development of the embryo" (1997, p. 291, emp. added).

Margulis and Sagan have admitted that meiosis is critical for sexual reproduction. Yet in their book, *Slanted Truths*, they stated unequivocally that "meiotic sex" evolved approximately "520 million years ago" (1997, p. 293). How, pray tell, could the bacteria that are supposed to be responsible for the evolution of sex have "stabilized a billion years ago" (as Dr. Grassé plainly stated that they did), and then 500 million years **after** that stabilization, mutate enough to "evolve" the painstaking process of meiosis? Is anyone actually listening to what evolutionists are saying? Read carefully the following scenario, as set forth in Jennifer Ackerman's book, *Chance in the House of Fate*, and as you do, concentrate on the items I have placed in bold print that are intended to draw the reader's attention to the "just-so" nature of the account being proffered.

> "The first sex cells **may** have been interchangeable and of roughly the same size. **By chance**, some **may have been** slightly bigger than others and stuffed with nutrients, an advantage in getting progeny off to a good start. **Perhaps** some were smaller, faster, good at finding mates. As organisms continued to meld and join their genetic material, the pairs of a larger cell with a smaller one proved an efficient system. **Over time**, the little rift between the sexes widened, as did the strategies of male and female for propagating their own genes" (2001, pp. 48-49, emp. added).

The first sex cells **may** have been…. **By chance**, some **may have been**…. **Perhaps** some were…. **Over**

time, the…. It is little wonder then, that in their more candid moments, evolutionists admit, as Ackerman eventually did, that "**when it comes to sex, we inhabit a mystery**" (p. 115, emp. added).

Notice, however, the admission by Margulis and Sagan that "meiosis seems connected with complex cell and tissue differentiation." Yes, it certainly does—**now**! But how did a process as incredibly complex as meiosis ever get started in the first place? What (or, better yet, **Who**) "intricately connected it with complex cell and tissue differentiation"? With all due respect, there is not an evolutionist on the planet who has been able to come up with an adequate (much less believable) explanation as to how somatic cells reproduce by mitosis (thereby maintaining the species' standard chromosome number in each cell), while gametes are produced by meiosis, wherein that chromosome number is halved so that, at the union of the male and female gametes during reproduction, the standard number is reinstated.

Lewis Thomas, the highly regarded medical doctor who served for many years as president of the prestigious Sloan-Kettering Cancer Center in New York City, was unable to contain either his enthusiasm or his praise for the system that we know as "sexual reproduction." In his book, *The Medusa and the Snail,* he wrote about the "miracle" of how one sperm cell forms with one egg cell to produce the cell we know as a zygote, which, nine months later, will become a completely new human being. His conclusion?

> "The mere existence of that cell should be one of the greatest astonishments of the earth. People ought to be walking around all day, all through their waking hours, calling to each other in endless wonderment, talking of nothing except that cell.... If anyone does succeed in explaining it, within my lifetime, I will charter a skywriting airplane, maybe a whole fleet of them, and send them aloft to write one great exclamation point after another around the whole sky, until all my money runs out" (1979, pp. 155-157).

Dr. Thomas' money was perfectly safe. No one has been able to explain—from an evolutionary viewpoint—the origin of sex, the origin of the incredibly complex meiotic process that makes sex possible, or the amazingly intricate development of the embryo (which is itself a marvel of design). At conception, the chromosomes inherited from the sperm are paired with the chromosomes inherited from the egg to give the new organism its full chromosomal complement. Evolutionary theorists ask us to believe that random, chance occurrences brought about this marvelously interdependent process of, first, splitting the genetic information into equal halves, and, second, recombining it through sexual reproduction. Not only is an intricate process required to produce a sperm or egg cell in the first place via meiosis, but another equally intricate mechanism also is required to rejoin the genetic information during fertilization in order to produce the zygote, which will become the embryo, which will become the fetus, which eventually will become the newborn. The idea that all of this "just evolved" is unworthy of acceptance, especially in light of the evidence now at hand.

The 50% Disadvantage

While sexual reproduction requires two parents (and therefore is neither as rapid nor as efficient as asexual reproduction), it does possess certain advantages, not the least of which is that species can benefit from the variability of mixing genetic material from two different parents. During sexual reproduction, organisms are required to produce haploid gametes (sperm or egg cells) in which meiotic division has occurred, in order to remove half of the genes. Then, when the gametes fuse (i.e., when the sperm fertilizes the egg), they produce a zygote—a process that restores the full diploid complement of chromosomes, with half coming from each parent. In the end, sexual reproduction causes only half of a parent's genes to be sent to each of its progeny. British evolutionist Richard Dawkins described the process as follows: "Sexual reproduction is analogous to a roulette game in which the player throws away half his chips at each spin. The existence of sexual reproduction really is a huge paradox" (1986, p. 130). Ask yourself this question: If organisms benefit by passing along their own genetic material, then why would these organisms "evolve" into a situation in which the reproduction process not only poses an enormous risk for genetic errors through mistakes in DNA replication, but also replaces half of their genetic material with that from another parental unit?

Sexual reproduction has a "selective disadvantage" of at least 50%—a disadvantage that will not budge! At conception, the zygote **receives** 50% of its genetic material from the father and 50% from the mother. However, by reproducing sexually, both the mother and father are required to **give up** 50% of

their own genetic material. This leaves both parents at a disadvantage, because a full 50% of their own genetic material will not be passed on. But, as Harvard's Ernst Mayr admitted, "No matter what the selective advantage of sexual reproduction may be, **that it does have such an advantage in animals is clearly indicated by the consistent failure of all attempts to return to asexuality**" (2001, p. 104, emp. added). The conundrum of sexual reproduction leaves evolutionists completely baffled because the terms are permanently fixed and completely unyielding. Considering the possibility of potential mechanisms for reproduction, it remains to be determined why nature ever would "evolve" sexual reproduction at all. In his book, *Sex and Evolution*, George C. Williams commented on this "50% disadvantage."

> "The primary task for anyone wishing to show favorable selection of sex is to find a previously unsuspected 50% advantage to balance the 50% cost of meiosis. Anyone familiar with accepted evolutionary thought would realize what an unlikely sort of quest this is. We know that a net selective disadvantage of 1% would cause a gene to be lost rapidly in most populations, and [yet] sex has a known disadvantage of 50%. The problem has been examined by some of the most distinguished of evolutionary theorists, but they have either failed to find any reproductive advantage in sexual reproduction, or have merely showed the formal possibility of weak advantages that would probably not be adequate to balance even modest recombinational load. **Nothing remotely approaching an advantage that could balance the cost of meiosis has been suggested**. **The impossibility of sex being an immediate reproductive adaptation in higher organisms would seem to be as firmly established a conclusion as can be found in current evolutionary thought. Yet this conclusion must surely be wrong. All around us are plant and animal populations with both asexual and sexual reproduction**" (1975, p. 11, emp. added).

While evolutionists admit that sex is **dis**advantageous to an individual (at a whopping 50% rate!), they nevertheless claim that it has some "evolutionary advantage" to the entire species. Therefore, they classify sex as an "altruistic" trait because it operates at an expense to the individual, yet is beneficial to the entire community. Evolutionists commonly refer to this "benefit" as "diversity."

Early in the twentieth century, geneticists August Weismann, R.A. Fisher, and H.J. Muller elucidated the importance of diversity, stating, "Sex increases diversity, enabling a species to more rapidly adapt to changing environments and thereby avoid extinction" (as quoted in ReMine, 1993, p. 200) They believed this diversity allowed evolution to occur much more rapidly. At first, their idea appeared plausible and reasonable, and, in fact, was taught in an unchallenged fashion for several decades. Commenting on the altruism theory about the origin of sex, M.T. Ghiselin wrote,

> "Weismann explicitly stated that sex exists for the good of the species, and even though Lloyd Morgan pointed out the fallacy [as early as 1890], this view remained the dominant one for nearly 80 years. Why this should have happened is something of a puzzle. The view does have certain intuitive appeal, but that does not explain why it was not subjected to more critical scrutiny" (1988, p. 11, bracketed item in orig.).

However, by the mid 1960s this explanation had been "subjected to a more critical scrutiny," and eventually the idea of group selection overriding individual selection was shown to be false and was discarded.

It also was believed that sexual reproduction might "speed up" evolution. However, theorists soon realized that—from an evolutionary viewpoint—an organism's "fitness" was damaged, not improved, as a result of sexual reproduction. Graham Bell pointed out,

> "Sex…does not merely reduce fitness, but halves it. If a reduction in fitness of a fraction of one percent can cripple a genotype, what will be the consequence of a reduction of 50 per cent? There can be only one answer: **sex will be powerfully selected against and rapidly eliminated wherever it appears. And yet this has not happened**" (1982, pp. 77-78, emp. added).

Additional scientific findings have caused researchers to do a 180-degree turn-around in their explanation of the evolutionary purpose of sex. It now is claimed that sex is advantageous, **not because it hastens evolution, but rather, because it slows it down**. The necessity in this change in direction was lamented by Bell:

> "To save the situation, then we must perform a complete volte-face [about-face]: just as it was self-evident to Weismann, Fisher and Muller that a faster rate of evolution would benefit a population, so we must now contrive to believe in the self-evident desirability of evolving slowly" (p. 100, bracketed material added).

This 180-degree about-face often is explained in the following manner. An asexual species is both too specialized and too dependent on its particular niche. As the niche vanishes, the species goes extinct. Asexual species thus inadvertently "adapt themselves out of existence" by refining a mode of life that is so restricted, it eventually disappears. Meanwhile, sexual species lag behind. Sex blunts the precision with which a species can adapt to a particular niche. Thus, according to evolutionists, sexual reproduction has slowed down evolution in order to prevent extinction. Considering the incredible difficulty involved in inventing a coherent theory about the origin of sex in the first place, and the vast smorgasbord of possible explanations available to try to explain sex, it is no wonder that we often find evolutionists disposing of one theory, only to replace it instantaneously with another.

Mars and Venus, or X and Y?

Modern self-help books would have us believe that men and women hail from "different planets," so to speak. But what **really** separates them, we are told, **are radically different chromosomes**. These chromosomes contain the genetic material that differentiates males and females. In order for a change to occur from asexual reproduction to sexual reproduction, two things (at the very least) had to occur: (1) a **single sex** first had to "evolve" (so that it then could evolve into a second sex—all the while retaining the first); and (2) double homologous chromosomes also had to evolve.

But by what known method could an asexual organism produce a **sexual** organism? And did you ever wonder: **Which** of the two sexes (male or female) evolved **first**? Well, wonder no more. Evolutionists somehow have divined the answer. As Jennifer Ackerman boldly put it, "**The female was the ancestral sex**, the first self-replicating organism; it gave rise to the male, a variant, and the two still share many characteristics" (2001, pp. 113-114, emp. added). Of course, Ms. Ackerman offered not a shred of scientific evidence for her audacious assertion—because there isn't any! Upon hearing her statement, I cannot help but be reminded of the now-famous comment made by R.E. Dickerson several years ago in a special issue of *Scientific American* on evolution. Dr. Dickerson (who was addressing specifically the evolution of the intricate "genetic machinery" of the cell) boasted that since "there are no laboratory models, one can speculate endlessly, **unfettered by inconvenient facts**" (1978, 239[3]:85, emp. added). That also applies to the subject of the origin of sex. There are no adequate laboratory models; hence, Ms. Ackerman is free to "speculate endlessly, unfettered by inconvenient facts," and to claim without any proof whatsoever that "the female was the ancestral sex."

The second issue—the sudden appearance of double homologous chromosomes—presents no less of a problem. Why is this the case? Of the 46 human chromosomes, 44 are members of identical pairs, but two, the X and Y (generally referred to as the "sex chromosomes"), stand apart. Evolutionists thus are faced with the daunting challenge of explaining not only the origin of sex chromosomes themselves, but also the evolution of **two totally different sex chromosomes** (X and Y).

Human females possess two X chromosomes, while men possess one X and one Y. Some evolutionists (like Ackerman, quoted above) argue that the male Y chromosome somehow evolved from the female X chromosome. We know today that the X chromosome is the "home" for thousands of genes, while the Y has only a few dozen. Of those, only 19 are known to be shared by both X and Y. If, as evolutionists argue, the Y chromosome originally was identical to the X, then researchers have a great deal of work ahead of them in order to explain the fact that of the 19 shared genes, the X chromosomes possesses all 19 on the tip of the short arm of the chromosome, whereas they are scattered across the entire length of the Y. Thus while both chromosomes do share certain genes, those genes are found in totally different places, indicating that the male Y chromosome is not simply an "evolved" X chromosome.

Differences in Animal and Human Sexuality

Humans, unlike animals, do not copulate merely for reproductive purposes. Humans, unlike animals, do not copulate merely for reproductive purposes. While under normal conditions human females ovulate only once during their monthly menstrual cycle, they nevertheless remain sexually receptive to their male counterparts throughout the entire month. Such receptivity indicates that mating at all other times (i.e., outside of the ovulation period) has no procreative function.

During sexual activity, the bodies of human males and females experience certain modifications and physiological changes that are not found in animals. Many of these represent modifications that account for the heightened stimulation and pleasure that occurs during copulation. If humans are a product of evolution, why, then, are females receptive to copulation almost all of the time, whereas animals utilizing an estrus cycle are not? Additionally, why do female humans experience menopause (the cessation of fertility via ovulation) as a regular phenomenon, which is not the norm for most wild animals? These are questions that evolutionists generally leave unasked, much less unanswered.

The human female's menstrual cycle is divided into two main phases—the follicular, (or proliferative) phase, and the luteal (or secretory) phase. The follicular phase (during which estrogen levels rise) is characterized first by menstruation, and then by proliferation of the endometrial tissue. The ovarian cycle in female primates, however, consists of four stages: proestrus, estrus, matestrus, and diestrus. It is only in the second stage (estrus) that the female animal experiences a swelling of the vulva, during which various uterine processes occur that result in receptivity to copulation. Physically, a female primate is not able to receive a male unless she is in estrus. [The term "estrus" comes from the Greek meaning "mad" or "frenetic desire," and generally is observed when female animals are "in heat."] Thus, the period of sexual receptivity of the female monkey or ape is much more restricted than that of a human female.

The differences that have been documented between estrus and menstrual cycles have caused evolutionists to formulate an attempted explanation for the human menstrual cycle. In 1993, Margie Profet, a self-taught evolutionary biologist, wrote a paper titled "Menstruation as a Defense Against Pathogens Transported by Sperm." Profet claimed that various microbial infections—caused by pathogen-toting spermatozoa—applied the adaptive pressure needed to cause menstruation. Simply put, she believed human sperm were carrying disease-causing organisms that necessitated the female to slough off the walls of the uterus as a means of self-defense. While other theories had existed prior to Profet's work, hers was the first to gain widespread scientific and public recognition. Three years later, Beverly Strassmann, an anthropologist at the University of Michigan in Ann Arbor, submitted a critical review of Profet's anti-pathogen hypothesis, and then proposed an alternative theory. She claimed that the reason the uterine endometrium is shed/reabsorbed in the cycle of regression and renewal is because it is energetically less costly than maintenance of the endometrium in an implantation state. I will leave it up to the reader to determine whether these scientists are "serious" or "seriously grasping." Suffice it to say that neither of these theories explains how or why the human female normally ovulates a single egg cell, instead of, say, five, six, seven, or more. They also do little to explain why human females routinely are sexually receptive, while animals are not. Anatomically speaking, how did humans "evolve" an anatomy that receives pleasure from sexual activity? **And why haven't we "evolved" enjoyment from other activities that evolutionists say were passed down from our ape-like ancestors?**

The Complexity of the Human Reproductive System

Consider just how sophisticated the human reproductive cycle must be in order to function correctly. During early juvenile years, humans experience a delayed sexual development phase in which reproduction does not occur. Is it by mere chance that our bodies are not able to reproduce at such a young age? Once this juvenile period is over, changes occur throughout the body, requiring simultaneous coordination of further development in many different types of tissues. Additionally, the production and regulation of gametes must be timed just right. Females also must endure a previously unknown monthly ovulation cycle, which allows for fertilization. Once fertilization takes place, the female body then must prepare itself for the many changes that occur during pregnancy. Are these carefully orchestrated processes mere happenstance?

While the male reproductive system may appear fairly simple, the true mechanics actually are quite complex. Unlike with other cells in the body, the production of sperm cells [spermatogenesis] does not occur at 98.6°F/37°C (normal body temperature). Instead, it occurs at a somewhat reduced temperature. To facilitate this, the sperm-producing organs, or testes, are located outside the body cavity in the scrotum, allowing them to remain about 3°C cooler than the rest of the body. This special location allows for the production of millions of sperm cells, which are stored according to maturity and then delivered dur-

ing sexual intercourse. Additionally, males possess a cremaster muscle, which involuntarily raises or lowers the scrotal sac (depending on environmental conditions) in order to maintain a constant testicular temperature. Are such things as the precise location and temperature regulation of the male testes just a fortuitous occurrence?

Likewise, the female body has been designed in such a manner as to be receptive to sperm, while at the same time being able to protect the abdominal area from bacteria in the environment. In addition, after producing eggs, the female reproductive system provides an environment in which a fertilized embryo can grow (keep in mind that the embryo does not possess its own blood supply, and therefore must obtain oxygen and nutrients from the mother's uterine wall). The uterus itself must be able to expand and hold the weight of an infant, plus the placenta and amniotic fluid—roughly 15 pounds—which is no small task (imagine a structure about the size of an orange able to expand and carry 3 five-pound bags of sugar!) After the child is born, the uterus returns to its normal size, and then, amazingly, is able to repeat this entire process again in future pregnancies. The female body also must orchestrate the production of milk for an infant, in conjunction with the baby's arrival. While we take many of these feats for granted, science has yet to design a machine that even comes close to mimicking biological reproduction.

Reproductive hormones also play a critical role in the orchestrated process of sexual development and reproduction. While certain hormones can be found in both males and females, their actions and target organs are completely different between the two sexes. Additionally, females possess reproductive hormones that are not found in males. Did these reproductive hormones also just "evolve?" The following is a summary of the hormones (found in males or females) that are required for humans to be able to reproduce.

Males

1. Follicle-stimulating hormone—stimulates spermatogenesis
2. Luteinizing hormone—stimulates the secretion of testosterone
3. Testosterone—stimulates the development and maintenance of male secondary sexual characteristics

Females

1. Follicle-stimulating hormone—stimulates the growth of ovarian follicle
2. Luteinizing hormone—stimulates conversion of ovarian follicles into corpus luteum; stimulates secretion of estrogen
3. Estrogen—stimulates development and maintenance of female secondary sexual characteristics; prompts monthly preparation of uterus for pregnancy.
4. Progesterone—completes preparation of uterus for pregnancy; helps maintain female secondary sexual characteristics
5. Oxytocin—stimulates contraction of uterus; initiates milk release
6. Prolactin—stimulates milk production

The levels and production of these various hormones must be maintained carefully and regulated on a daily basis. Is this complex internal feedback mechanism—which is carried out primarily by the brain—purely a trait that was passed on from our alleged original sea-dwelling ancestors? If it is, why, then, don't those sea-dwelling organisms possess the same hormones? The total complexity of the human reproductive system is practically incomprehensible. While scientists try to "play God" in their attempts to create living humans in laboratory settings, they still are light-years away from creating actual egg and sperm cells and all of the necessary components associated with them.

Anatomical Differences between Human Males and Females

Any second-grade child easily could identify anatomical differences between the male and female species. However, these represent only **external** features. There also exist numerous **internal** differences. If we are to believe that sexual reproduction evolved from asexual reproduction, this means that the ga-

metes also evolved. Anatomically speaking, what are the "chances" of a female evolving an egg large enough to accept the genetic material from the male (so that the conceived embryo has a chance to grow), yet small enough that it can fit through her own fallopian tubes? Furthermore, the egg also must possess the capability of creating a special barrier once that single sperm has penetrated the egg's cell wall, so that no other sperm can penetrate and add still more genetic material. And exactly how long in the evolutionary scheme of things did it take for a sperm cell to become small enough to be able to fertilize the egg, yet motile enough so that it could reach the egg?

With all of these anatomical differences, we must consider that each one also represents an entirely different type of cell that may or may not be present in the opposite sex. Yet evolutionists suggest that all of this is merely a "historical accident." Furthermore, the expense of producing two separate genders via such an accident is extremely costly for the species. Consider, for example, the fact that we have males and females in approximately equal numbers. Scientifically speaking, it requires only a few males to keep a species alive and thriving. From an evolutionary point of view, the expense of producing so many males would appear not only unnecessary, but also counterproductive. Jones noted,

> "Biologists have an adolescent fascination with sex. Like teenagers, they are embarrassed by the subject because of their ignorance. What sex is, why it evolved and how it works are the biggest unsolved problems in biology. Sex must be important, as it is so expensive. If some creatures can manage with just females so that every individual produces copies of herself, why do so many bother with males? A female who gave them up might be able to produce twice as many daughters as before; and they would carry all of her genes. Instead, a sexual female wastes time, first in finding a mate and then in producing sons who carry only half of her inheritance. We are still not certain why males exist; and why, if we must have them at all, nature needs so many. Surely, one or two would be enough to impregnate all the females but, with few exceptions, the ratio of males to females remains stubbornly equal throughout the living world" (1993, p. 84).

But what is this great expense to which biologists continually refer? The anatomical differences observed in males and females go far beyond the external differences observed by the second grader mentioned above. Yet scientists admittedly are reluctant to examine these differences in light of evolutionary theory.

Realize that each one of these anatomical structures requires its own arterial and venous blood supply, as well as processes of nerve innervation that are not always apparent in the opposite sex. Additionally, many of these structures have their own specific lymphatic drainage. **How could the vascular and nervous tissue that supports the male prostate have evolved from a female equivalent** (remember Ackerman's claim that the first sex to evolve was the female?), **since females do not even possess a prostate?** Did humans continue to evolve to accommodate **all** the sexual and reproductive organs?

Cellular Differences between Human Males and Females

The human sperm cell and egg cell have been optimized in totally different ways. The egg is nonmotile, covered by a protective coating, and carries a large nutrient supply for growth and development. Sperm cells, by contrast, are extremely motile, built solely for fertilization, and have been streamlined for delivering DNA to the egg. Evolutionists would have us believe that these differences resulted from millions of years of trial and error. However, in the case of reproduction, **sperm and egg cells that are not fully functional do not result in fertilization—thus the species would not be able to reproduce, and therefore would become extinct**. How many generations of "error" would it take in this trial-and-error period before all sexually reproducing animals would die out? Are we to believe that these two totally different types of cells happened practically overnight by chance? Take a closer look at these two cells to determine if they are the products of chance—or the product of design.

Sperm cells are unlike any other cells in the body. They have been "stripped down" of everything unnecessary for fertilization—thus they are not encumbered with things like ribosomes, an endoplasmic reticulum, or a Golgi apparatus. However, the mitochondria (the powerhouses of the cell) have been arranged strategically in the center of the sperm cell where they can most efficiently propel the flagellum. This long, motile flagellum is driven by dynein motor proteins that use the energy of ATP (provided by all

those mitochondria) to slide the microtubules inside the flagellum, thus bending certain portions of it. The head (or cap) of the sperm contains a specialized acrosomal vesicle, which contains hydrolytic enzymes that allow the sperm to penetrate the egg's outer layer. Without this special vesicle, the sperm cell would be unable to penetrate the coating of the egg cell. Upon contact with the egg, the contents of the acrosomal vesicle are released and the sperm cell then is bound tightly to the egg so that the genetic material can be transferred (Alberts, et al., 1994, p. 1026). Production of these incredible cells occurs throughout life. In a man, it takes about 24 days for a spermatocyte to complete meiosis in order to become a spermatid, and then another 5 weeks for a spermatid to develop into a mature motile sperm. Does this sound like something that occurred randomly overnight?

Egg cells, on the other hand, proliferate only in the fetus. These special cells undergo meiosis well before birth, but then can remain in a "suspended" state for up to 50 years. So while sperm cells are produced continually over a man's lifetime, egg cells are produced only during fetal development (i.e., no more are made after the female baby is born). During this fetal production stage, enough eggs are produced to last an adult woman throughout her life. The yolk, or egg cytoplasm, in these egg cells is rich in lipids, proteins, and polysaccharides. Egg cells also contain specialized secretory vesicles (located under the plasma membrane) that possess cortical granules. These granules alter the egg coat upon fertilization in order to prevent more than one sperm from fusing with the egg (Alberts, et al., p. 1022). Additionally, egg cell development (a developing egg is called an oocyte) occurs in timed stages after mensus begins. Interestingly, while the general stages of oocyte development are similar, we know today that this process actually varies from species to species. How does the randomness concept associated with evolution explain these extremely complex cellular characteristics, or the differences seen among species? Homer Jacobson addressed such problems when he stated,

> "Directions for the reproduction of plans, for energy and the extraction of parts from the current environment, for the growth sequence, and for the effector mechanism translating instructions into growth—all had to be simultaneously present at that moment. **This combination of events has seemed an incredibly unlikely happenstance, and has often been ascribed to divine intervention**" (1955, 43:121, emp. added).

Sexual reproduction is not merely the product of millions of years of evolution. As the numerous examples of differences presented here adequately demonstrate, the highly complex and intricate manner in which the human body reproduces cannot logically be attributed to a matter of mere chance or a "lucky role of the dice." Such "explanations" simply do not fit the available evidence, or the logical conclusions to be drawn from that evidence.

NON-EVOLUTIONIST'S FOURTH AFFIRMATIVE: THE MYSTERY OF THE ORIGIN OF LANGUAGE

In 1994, an article appeared in *Time* magazine titled, "How Man Began." Within that article was the bold assertion, "No single, essential difference separates human beings from other animals" (Lemonick, 143[11]:81). Yet, in what is obviously a blatant contradiction to such a statement, evolutionists admit that **communication via speech is uniquely human**—so much so that it often is used as the singular most important dividing line between humans and animals. In a book titled *Eve Spoke*, evolutionist Philip Lieberman admitted, "Speech is so essential to our concept of intelligence that its possession is virtually equated with being human. Animals who talk **are** human, because what sets us apart from other animals is the 'gift' of speech" (1998, p. 5, emp. in orig.). In *The Cambridge Encyclopedia of Human Evolution*, editors Jones, Martin, and Pilbeam conceded that "[t]here are no non-human languages," and then went on to observe that "language is an adaptation unique to humans, and yet the nature of its uniqueness and its biological basis are notoriously difficult to define" (1992, p. 128). Terrance Deacon noted,

> "In this context, then, consider the case of human language. It is one of the most distinctive behavioral adaptations on the planet. Languages evolved in only one species, in only one way, without precedent, except in the most general sense. And the differences between languages and all other natural modes of communicating are vast" (1997, p. 25).

What events transpired that allowed humans to speak, while leaving animals to remain silent? If we are to believe the evolutionary teaching that currently is taking place in colleges and universities around the world, speech evolved as a natural process through time. Yet no one is quite sure how, and there are no known animals that are in a transition phase from non-speaking to speaking. In fact, in the *Atlas of Languages* the following remarkable admission can be found: "No languageless community has ever been found" (Matthews, et al., 1996, p. 7). This represents no small problem for evolutionists. In fact, the origin of speech and language (along with the development of sex and reproduction) remains one of the most significant hurdles in evolutionary theory, even in the twenty-first century. In fact, some evolutionists simply have stopped discussing the matter altogether. Jean Aitchison noted, "In 1866, a ban on the topic was incorporated into the founding statues of the Linguistic Society of Paris, perhaps the foremost academic linguistic institution of the time: 'The Society does not accept papers on either the origin of language or the invention of a universal language' " (2000, p. 5). That is an amazing (albeit inadvertent) admission of defeat, especially coming from a group of such eminent scientists, researchers, and scholars.

The truth of the matter is, however, that the origin of human languages **can** be discerned—**but not via the theory of evolution**. Many animals are capable of using sounds to communicate. However, there is a colossal difference between the grunt of a pig or the hoot of an owl, and a human standing before an audience reciting Robert Frost's "The Road Not Taken." This enormous chasm between humans and animals has led to a multiplicity of theories on exactly how man came upon this unequaled capability. But there is one common theme that stands out amidst all the theories: "The world's languages evolved spontaneously. They were not designed" (Deacon, p. 110).

Design indicates that there was a designer; thus, evolutionists have conjured up theories that consider language nothing more than a fortuitous chain of events. Most of these theories involve humans growing bigger brains, which then made it physiologically possible for people to develop speech and language. For instance, in the foreword of her book, *The Seeds of Speech,* Jean Aitchison hypothesized,

> "Physically, a deprived physical environment led to more meat-eating and, as a result, a bigger brain. The enlarged brain led to the premature birth of humans, and in consequence a protracted childhood, during which mothers cooed and crooned to their offspring. An upright stance altered the shape of the mouth and vocal tract, allowing a range of coherent sounds to be uttered" (2000, p. x).

Thus, according to Aitchison, we can thank "a deprived physical environment" for our current ability to talk and communicate. Another evolutionist, John McCrone, put it this way:

> "It all started with an ape that learned to speak. Man's hominid ancestors were doing well enough, even though the world had slipped into the cold grip of the ice ages. They had solved a few key problems that had held back the other branches of the ape family, such as how to find enough food to feed their rather oversized brains. Then man's ancestors happened on the trick of language. Suddenly, a whole new mental landscape opened up. Man became self-aware and self-possessed" (1991, p. 9).

Question: How (and why) did that first ape learn to speak? It is easy to suggest that "it all started with an ape that learned to speak." But it is much more difficult to describe **how** this took place, especially in light of our failure to teach apes to speak today. Michael Corballis, in his book, *From Hand to Mouth: The Origins of Language*, stated,

> "My own view is that language developed much more gradually, starting with the gestures of apes, then gathering momentum as the bipedal hominins evolved. The appearance of the larger-brained genus *Homo* some 2 million years ago may have signaled the emergence and later development of syntax, with vocalizations providing a mounting refrain. What may have distinguished *Homo sapiens* was the final switch from a mixture of gestural and vocal communication to an autonomous vocal language, embellished by gesture but not dependent on it" (2002, p. 183).

The truth, however, is that evolutionists can only speculate as to the origin of language. Evolutionist Carl Zimmer summed it up well when he wrote, "No one knows the exact chronology of this evolution, because language leaves precious few traces on the human skeleton. The voice box is a flimsy piece of cartilage that rots away. It is suspended from a slender C-shaped bone called a hyoid, but the ravages of time usually destroy the hyoid too" (2001, p. 291).

Thus, theories are plentiful—while the evidence to support those theories remains mysteriously unavailable. Add to this the fact that humans acquire the ability to communicate (and even learn some of the basic rules of syntax) by the age of two, and you begin to see why Aitchison admitted, "Of course, holes still remain in our knowledge: in particular, at what stage did language leap from being something new which humans discovered to being something which every newborn human is scheduled to acquire? This is still a puzzle" (p. ix). Yes, it is "a puzzle." [Recall my earlier comment that in the specific areas of evolutionary thought that are incontrovertibly the most important for the theory's hegemony and success, one finds at every turn "challenges," "problems," "quandaries," "enigmas," "mysteries," "disappointments," and "puzzles"?]

Nobody knows exactly how many languages there are in the world, partly because of the difficulty of distinguishing between a language and a sub-language (or dialects within it). One authoritative source that has collected data from all over the world, *The Ethnologue*, lists the total number of languages as 6,809. Many evolutionary linguists believe that all human languages descended from a single, primitive language, which itself evolved from the grunts and noises of "lower animals." The single most-influential "hopeful monster" theory of the evolution of human language was proposed by Noam Chomsky, the famed linguist of MIT, and has since been echoed by numerous anthropologists, philosophers, linguists, and psychologists. Chomsky argued that the ability of children to acquire the grammar necessary for a language can be explained only if we assume that all grammars are variations of a single, generic "universal grammar," and that all human brains come "with a built-in language organ that contains this language blueprint" (Deacon, 1997, p. 35).

The Brain's Language Centers

In contemplating how language arose, evolutionists frequently link the evolution of the brain to the appearance of languages. But consider that over 6,000 languages exist, and you begin to understand that the development of language cannot be viewed as a simple, clear-cut addition to human physiology that was made possible by an enlarged brain unique to *Homo sapiens*. Terrance Deacon commented on the intricacy of evolving a language when he stated, "For a language feature to have such an impact on brain evolution that all members of the species come to share it, it must remain invariable across **even the most drastic language change possible**" (p. 329, emp. in orig.).

The complexity underlying speech began to reveal itself in patients who were suffering various communication problems. Researchers began noticing analogous responses among patients with similar injuries. The ancient Greeks noticed that brain damage could cause the loss of the ability to speak (known as aphasia). Centuries later, in 1836, Marc Dax described a group of patients who could not speak normally. Dax reported that all of these patients experienced damage to the left hemisphere of their brains. In 1861, Paul Broca described a patient who could speak only a single word (the word "tan"). When this patient died, Broca examined his brain and noted damage to the left frontal cortex, which has since become known anatomically as "Broca's area." While patients with damage to Broca's area can understand language, they generally cannot produce speech because words are not formed properly; thus, their speech is slurred and slow.

In 1876, Carl Wernicke found that language problems also could result from damage to another area of the brain. This area, later termed "Wernicke's area," is located in the posterior part of the temporal lobe. **Damage to Wernicke's area results in a loss of the ability to understand language**. Thus, patients can continue to speak, but the words are put together in such a way that they make no sense. Interestingly, in most people (around 97%), both Broca's area and Wernicke's area are found only in the left hemisphere, which explains the language deficits observed in patients with brain damage to the left side of the brain. Evolutionists freely acknowledge that "[t]he relationship between brain size and language is unclear" (Aitchison, 2000, p. 85).

But the brain is not simply larger. The connections are vastly different as well. As Deacon went on to admit, "Looking more closely, we will discover that a radical re-engineering of the whole brain has taken place, and on a scale that is unprecedented" (p. 45). In order to speak a word that has been read, information is obtained from the eyes and travels to the visual cortex. From the primary visual cortex, information

is transmitted to the posterior speech area (which includes Wernicke's area). From there, information travels to Broca's area, and then to the primary motor cortex to provide the necessary muscle contractions to produce the sound. To speak a word that has been heard, we must invoke the primary auditory cortex, not the visual cortex. Deacon commented on this complex neuronal network—not found in animals—when he wrote,

> "There is, without doubt, something special about human brains that enables us to do with ease what no other species can do even minimally without intense effort and remarkably insightful training. We not only have the ability to create and easily learn simple symbol systems such as the chimps Sherman and Austin struggled to learn, but in learning languages we acquire an immensely complex rule system and a rich vocabulary at a time in our lives when it is otherwise very difficult to learn even elementary arithmetic. Many a treatise on grammatical theory has failed to provide an adequate accounting of the implicit knowledge that even a four-year-old appears to possess about her newly acquired language" (p. 103).

The Anatomy of Speech

The mechanics involved in speaking have anatomical requirements that are found primarily in humans. There is no animal living presently, nor has one been observed in the fossil record, that possesses anything close to the "voice box" (as we commonly call it) that is present in humans. As information scientist Werner Gitt observed in his intriguing book, *The Wonder of Man*,

> "Only man has the gift of speech, a characteristic otherwise only possessed by God. This separates us clearly from the animal kingdom…. In addition to the necessary 'software' for speech, we have also been provided with the required 'hardware'" (1999, p. 101).

Furthermore, the lack of any "transitional" animal form (with the requisite speech hardware) in the fossil record poses a significant continuity problem for evolutionists. As Deacon noted,

> "This lack of precedent makes language a problem for biologists. Evolutionary explanations are about biological continuity, so a lack of continuity limits the use of the comparative method in several important ways. We can't ask, 'What ecological variable correlates with increasing language use in a sample species?' Nor can we investigate the 'neurological correlates of increased language complexity.' There is no range of species to include in our analysis" (p. 34).

To simplify the anatomy required for speech by using an analogy, think of a small tube resting inside a larger tube. The inner tube consists of the trachea going down to the lungs, and the larynx (which houses the voice box). At the larynx, the inner tube opens out to the larger tube, which is known as the pharynx. It not only carries sound **up** to the mouth, but also carries food and water from the mouth **down** to the stomach. A simplistic description of how humans utter sounds in speech can be characterized by the control of air generated by the lungs, flowing through the vocal tract, vibrating over the vocal cord, being filtered by facial muscle activity, and then being released out of the mouth and nose. Just as sound can be generated by forcing air across the narrow mouth of a bottle, air is streamed across the vocal cords, which can be tightened or relaxed to produce a variety of different resonances. The physiological components necessary can be divided into: (1) the supralaryngeal vocal tract; (2) the larynx; and (3) the subglottal system.

In 1848, Johannes Muller demonstrated that human speech involved modulation of acoustic energy by the airway above the larynx (called the supralaryngeal tract). The sound energy for speech is generated in the larynx at the vocal folds. The subglottal system, which consists of the lungs, trachea, and their associated muscles, provides the necessary power for speech production. The lungs produce the initial air pressure that is essential for the speech signal; the pharyngeal cavity, oral cavity, and nasal cavity shape the final output sound that is perceived as speech.

Birds of a Feather—Or Naked Ape?

Imagine the conundrum in which evolutionists find themselves when it comes to speech and language. The animal that comes closest to producing anything that even vaguely resembles human speech is not another primate, but rather a bird. Deacon noted,

> "In fact, most birds easily outshine any mammal in vocal skills, and though dogs, cats, horses, and mon-

> keys are remarkably capable learners in many domains, vocalization is not one of them. Our remarkable vocal abilities are not part of a trend, but an exception" (pp. 30-31).

For instance, a famous African gray parrot in England named Toto is able to pronounce words so clearly that he sounds rather human. Like humans, birds can produce fluent, complex sounds. We both share a double-barreled, double-layered system involving tunes and dialects, which is controlled by the left side of our brains. And just like young children, juvenile birds experience a period termed "sub-song" where they twitter in what resembles the babbling of a young child learning to speak. Yet Toto does not have "language" as humans understand it. Humans use language for many more purposes than birds use song. Consider also that it is mostly male birds that sing. Females remain songless unless they are injected with the male hormone testosterone (see Nottebohm, 1980). Consider also that humans often communicate intimately between two or three people, while bird communication is generally a long-distance affair.

Oddly, some researchers have even gone so far as to suggest that both animate and inanimate objects can communicate. According to a group that refers to itself as the Global Psychic Team, "animals, trees, plants, rocks—all of nature—telepathically communicate with us, sending images, feelings, even words. The key is in learning how to listen and respond" (see "Animals Talk," 2002). But what evidence exists to demonstrate that animals (much less plants and rocks!) have the unique ability to communicate that is possessed by humans? While evolutionary language scientists assert differently, the truth is that animals do not possess the ability to talk and communicate like humans.

One of the big "success" stories in looking at the human-like qualities of non-human primates is a male bonobo chimp known as Kanzi (see Savage-Rumbaugh and Lewin, 1994; Skoyles and Sagan, 2002, pp. 217-220). Kanzi was born October 28, 1990, and began his journey to learn to "speak" as a result of the training given to his mother, Matata, via a "talking" keyboard. Matata never did master the keyboard, but Kanzi did. Through many years of intense training and close social contact with humans, this remarkable animal attained the language abilities of an average two-year-old human. By age ten, he had a "spoken" vocabulary (via the keyboard) of some two hundred words. In fact, Kanzi was able to go beyond the mere parroting or "aping" of humans; he actually could communicate his wants and needs, express feelings, and use tools. When tested against a two-year-old girl by the name of Alia (where both the girl and the chimp were given verbal instructions to carry out certain tasks), Kanzi performed better than Alia. And, as he grew into adulthood, Kanzi began to prefer the company of humans to that of other chimps. Inasmuch as Kanzi can accomplish these things, does this prove that chimps are merely hairy, child-like versions of humans?

Hardly. To use the words of the late, well-known American news commentator, Paul Harvey, someone needs to tell "the rest of the story." For example, in their volume, *Up from Dragons,* John Skoyles and Dorion Sagan discussed Kanzi at great length. Among other things, they wrote,

> "Kanzi did this when he was 5, and Alia was only 2. But it was not really a fair contest. Alia was learning not only to understand spoken speech, but also to speak, something that would provide feedback on her comprehension. Since **Kanzi could not make speech sounds**, he was working under a handicap when trying to understand spoken English. It is remarkable that he could understand single words, let alone the short sentences above. Interestingly, **while Kanzi will never, for anatomical reasons, be able to speak**, he does have a far wider range of vocal sounds than other chimps….
>
> "Kanzi shows that while chimps may have the potential to learn language, they require a "gifted" environment to do so. Kanzi was surrounded by intelligent apes with PhDs who spoke to him and gave him a stream of rich interactions. They gave Kanzi's brain a world in which it could play at developing its ability to communicate…. Therefore, as much as in his brain, **Kanzi's skill lies in the environment that helped shape it**" (2002, pp. 215,216, emp. added).

Kanzi does not have the anatomical equipment required for speech. Aside from the mimicking ability of parrots, no animal does. As Skoyles and Sagan noted, "Chimps lack the vocal abilities needed for making speech sounds—speech requires a skilled coordination between breathing and making movements with the larynx that chimps lack" (p. 214). Humans, however, **do** possess the anatomical equipment required for speech.

But there is more. Regardless of the amount of instruction such animals receive, there appear to be built-in limits on their progress. On February 15, 1994, the public television program NOVA aired a show titled "Can Chimps Talk?" The show began with a "conversation" with Kanzi, who was required to use a talking keyboard to respond to queries from his human counterpart. As the television program demonstrated quite effectively, he often responded incorrectly when asked a question. For instance, one of the humans asked, "Is there any other food you'd like me to bring in the backpack?" Kanzi's talking keyboard response was: "ball."

The program then focused on Washoe, a chimpanzee that, in the 1970s, was taught a portion of American Sign Language by Allen and Beatrice Gardner at the University of Nevada. By the time Washoe was five, the trainers reported that she could use 133 signs. Headlines were quick to report that a non-human primate was using human language. This spurred other scientists, such as Herb Terrace, to begin experimenting with animal language. Terrace set out to replicate some of the Gardners' study by using his own ape, Nim Chimsky (sarcastically named after Noam Chomsky, who believes language is confined solely to humans). The main goal of the project was to determine if a chimpanzee could create a sentence. In the documentary, Terrace stated: "I have concluded that, unfortunately, the answer to that question is no." Nim's sign usage could best be interpreted as a series of "conditioned discriminations" similar to behaviors seen in many less-intelligent animals. This work suggested that Nim, like circus animals, was using words only to obtain food rewards. Terrace realized that while Nim seemed to be using a combination of signs, he actually was imitating the trainer. This caused Terrace to look at some of Gardners' films. He decided that Washoe, too, was being led by his teacher and was merely imitating.

As Skoyles and Sagan candidly admitted, Kanzi's skill was "in the environment that helped shape it." That is exactly what Terrace discovered. Such an assessment always will be true of "talking animals." But it is not always true of humans. Consider the following case in point.

As I mentioned earlier, the eminent linguist Noam Chomsky has championed the idea that humans are born with a built-in "universal grammar"—a series of biological switches for complex language that is set in place in the early years of childhood. This, he believes, is why children can grasp elaborate language rules even at an early age—**even without adults to teach them**. Chomsky noted, "The rate of vocabulary acquisition is so high at certain stages in life, and the precision and delicacy of the concepts acquired so remarkable, that it seems necessary to conclude that in some manner the conceptual system with which lexical items are connected is already in place" (1980, p. 139). John W. Oller and John L. Omdahl went on to comment,

> "In other words, the conceptual system is not really constructed in the child's mind as if out of nothing, but must be, in an important sense, known before the fact. The whole system must be in place before it can be employed to interpret experience" (1997, p. 255, emp. in orig.).

Powerful support for Chomsky's theory emerged from a decade-long study of 500 deaf children in Managua, Nicaragua, which was reported in the December 1995 issue of *Scientific American* (Horgan, 1995, 273[6]:18-19). These children started attending special schools in 1979, but none was taught (or used) a formal sign language. Within a few years, and under no direction from teachers or other adults, they began to develop a basic "pidgin" sign language. This quickly was modified by younger children entering school, with the current version taking on a complex and consistent grammar. If Chomsky is correct, where, then, did humans get their innate ability for language? Chomsky himself will not even hazard a guess. In his opinion, "very few people are concerned with the origin of language because most consider it a hopeless question" (as quoted in Ross, 1991, 264[4]:146). The development of language, he admits, is a "mystery." [Recall my earlier comment that in the specific areas of evolutionary thought that are incontrovertibly the most important for the theory's hegemony and success, one finds at every turn "challenges," "problems," "quandaries," "enigmas," "puzzles," "disappointments," and "mysteries"?] The fundamental failing of naturalistic theories is that they are inadequate to explain the origins of something so complex and information-rich as human language.

The fact is, no animal is capable of speaking in the manner in which people can speak. Speech is a peculiarly **human** trait. In an article titled "Chimp-Speak" that dealt with this very point, Trevor Major wrote,

> "First, chimps do not possess the anatomical ability to speak. Second, the sign language they learn is not natural, even for humans. Chimps have to be trained to communicate with this language; it is not something they do in the wild. And unlike humans, trained chimps do not seem to pass this skill on to their young. Third, chimps never know more than a few hundred words—considerably less than most young children.... [E]volutionists have no way to bridge the gap from innate ability to language relying on natural selection or any other purely natural cause. Why? Because language is complex and carries information…" (1994, 14[3]:1).

Another MIT scientist, Steven Pinker (director of the university's Center of Cognitive Neuroscience), stated in *The Language Instinct: The New Science of Language and Mind*,

> "As you are reading these words, you are taking part in one of the wonders of the natural world. For you and I belong to a species with a remarkable ability: we can shape events in each other's brains with remarkable precision. I am not referring to telepathy or mind control or the other obsessions of fringe science; even in the depictions of believers, these are blunt instruments compared to an ability that is uncontroversially present in every one of us. **That ability is language**. Simply by making noises with our mouths, we can reliably cause precise new combinations of ideas to arise in each other's minds. The ability comes so naturally that we are apt to forget what a miracle it is....
>
> "Language is obviously as different from other animals' communication systems as the elephant's trunk is different from other animals' nostrils.... As we have seen, human language is based on a very different design. The discrete combinatorial system called 'grammar' makes human language infinite (there is no limit to the number of complex words or sentences in a language), digital (this infinity is achieved by rearranging discrete elements in particular orders and combinations, not by varying some signal along a continuum like the mercury in a thermometer), and compositional (each of the infinite combinations has a different meaning predictable from the meanings of its parts and the rule and principles arranging them). Even the seat of human language in the brain is special..." (1994, pp. 1,365, parenthetical comments in orig., emp. added).

Without detracting anything from primates like Kanzi and Washoe, fundamental differences between animals and humans nevertheless remain. Unlike human children, animals: (1) do not have a special region in the brain devoted to language; (2) have a much smaller brain overall; and (3) lack the anatomy to speak the words they may think. In summary, humans have an innate, built-in, hard-wired ability to acquire and communicate complex languages from the moment of their birth.

Admittedly, animals **do** possess a measure of understanding. They can learn to respond to commands and signs, and in some cases even can be trained to use minimal portions of human sign language. But, as biologist John N. Moore has pointed out,

> "Although the chimpanzee Washoe has been taught the American Sign Language, such an accomplishment is **primarily** an increase in an ability of the anthropoid to respond to direct presentation of **signs**. And, further, the learned capability of the chimpanzee Lana to utilize push buttons connected with a computer to 'converse' with a human trainer depends fundamentally upon increased conditional reflex response to **signs**" (1983, p. 341, emp. in orig.).

Even though apes, dogs, and birds can be "trained" to do certain things, they cannot reason and communicate ideas with others so as to have true mental communion. The intelligence of animals is unlike that of humankind. As Moore went on to discuss,

> "The purest and most complex manifestation of man's symbolic nature is his capacity for conceptual thought, that is, for thought involving sustained and high order abstraction and generalization. Conceptual thought enables man to make himself independent of stimulus boundness that characterizes animal thinking. Animals, especially primates, give undeniable evidence of something **analogous** to human thought—analogous yet medically different in that their thought is bound to the immediate stimulus situation and to the felt impulse of the organism. Animal thinking, too, is riveted to the realm of survival (broadly taken) and therefore encompasses a variety of needs pertinent to the species as well as to the individual. These

> differences account for the distinction between **conceptual** thought, which is the exclusive prerogative of man, and **perceptual** thought, a cognitive function based directly upon sense perception, which man shares with other animals" (p. 344, parenthetical item and emp. in orig.).

Thus, the issue is not "can animals think?," but rather "can they think the way humans do?" The answer, obviously, is a resounding "No!" In summarizing his thoughts on this subject, Trevor Major offered the following conclusion concerning the intelligence of chimpanzees:

> "Are chimps intelligent? The answer is yes. Do chimps possess the **same kind** of intelligence as humans? The answer would have to be no. Humans are more intelligent, **and** they possess additional forms of intelligence. What we must remember, also, is that the greatest capabilities of the apes belong to a handful of superstars like Kanzi and Sheba. Even these animals lack the empathy, foresight, and language capabilities of all but the youngest or most intellectually challenged of our own species" (1995, 15:88, emp. in orig.).

Moore commented further,

> "Animals can think in several ways...though only on the perceptual, not on the conceptual level. The key difference here is one between conceptual and perceptual thinking. The latter, which is typical of animal thinking, requires the actual or nearly immediate presence of the pertinent objects. Man's thinking, on the other hand, is independent of the presence of pertinent objects. It is, in fact, independent of objects altogether, as is the case with logical or mathematical exercises. Secondly, the difference between human and animal thinking resides in the fact that, whether or not the object of the mental operation is present, animals cannot make judgments or engage in reasoning. For example, animals are unable to conclude that such and such **is** or **is not** the case in a given situation or that **if** such and such is the case, **then** so and so is not" (p. 344, ellipses and emp. in orig.).

Although animal trainers and investigators since the seventeenth century have tried to teach chimpanzees to talk, no chimpanzee has ever managed it. A chimpanzee's sound-producing anatomy is simply too different from that of humans. Chimpanzees might be able to produce a muffled approximation of human speech—if their brains could plan and execute the necessary articulate maneuvers. But to do this, they would have to have our brains, **which they obviously do not** (Lieberman, 1997, p. 27).

The Complexity of Language: Uniquely Human

No known language in all of human history can be considered "primitive" in any sense of the word. In her book, *What is Linguistics?*, Suzette Elgin remarked, "The most ancient languages for which we have written texts—Sanskrit for example—are often far more intricate and complicated in their grammatical forms than many other contemporary languages" (1973, p. 44). Lewis Thomas, a distinguished physician, scientist, and longtime director and chancellor of the Sloan Kettering Cancer Center in Manhattan, acknowledged that "language is so incomprehensible a problem that the language we use for discussing the matter is itself becoming incomprehensible" (1980, p. 59).

In a paper titled "Evolution of Universal Grammar" that appeared in the January 2001 issue of *Science*, M.A. Nowak and his colleagues attempted to discount the gulf that separates humans and animals (Nowak, et al., 2001). This paper, which was a continuation of a 1999 paper titled "The Evolution of Language" (Nowak and Krakauer, 1999), used mathematical calculations in an effort to predict the evolution of grammar and the rules surrounding it. While Nowak and his team inferred that the evolution of universal grammar can occur via natural selection, they freely admitted that "**the question concerning why only humans evolved language is hard to answer**" (2001, 96:8031, emp. added). **Hard to answer?!** The mathematical models presented in these papers do not tell us anything about the origination of the multitude of languages used in the world today. If man truly did evolve from an ape-like ancestor, how did the phonologic [the branch of linguistics that deals with the sounds of speech and their production] component of our languages become so diverse and variegated? Nowak's paper also did not clarify the origination of written languages, or describe how the language process was initiated in the first humans, considering we know today that parents teach languages to their offspring.

Nowak and his collaborators believe that the "first step" in the evolution of language was "signal-object associations." They speculate that common objects, frequently utilized, were given a representative

signal or sign (in a manner similar to modern sign language). These researchers also believe that early in evolution, these signals were "likely to have been noisy" and therefore "mistaken for each other." Nowak suggests that these errors necessitated the formation of words, and describes this step in the evolution of language as comparable to going "from an analogue to a digital system." However, there is no evidence that demonstrates how these "prehistoric" people made the quantum leap from signals to words. The last step Nowak describes is the evolution of basic grammatical rules in an effort to convey even more information than just simple words. While these speculations make a nice, neat, progressive path toward human language, they do little to explain adequately the anatomical differences found in animals and humans. The human supralaryngeal airway differs from that of any other adult mammal, and is quite essential for speech. While chimpanzees have been taught to communicate via sign language, they cannot speak, and do not appear to use any complex syntax in communication.

Nowak and his colleagues began with the assumption that language "evolved as a means of communicating information between individuals" (2001, 96:8030), and then went on to speculate that natural selection favors the emergence of a universal, rule-based language system. But if natural selection "favors" a complex language, how do we account for the nonvocal communication observed in animals, and why hasn't this communication "emerged" into a formal language in those animals? In an effort to explain this embarrassing lack of understanding, Nowak, et al., offered several speculations as to why animals have not evolved a better form of communication. In their explanation, they listed:

- Signal-object associations form only when information transfer is beneficial to both speaker and listener.
- In the presence of errors, only a very limited communication system describing a small number of objects can evolve by natural selection.
- Although grammar can be an advantage for small systems, it may be necessary only if the language refers to many events.
- Thus, animals may not possess the need to describe "many" events.

But such speculations leave gaping holes in regard to potential explanations as to why animals cannot use speech. As Deacon noted,

> "How could anyone doubt that language complexity is the problem? Languages are indeed complicated things. They are probably orders of magnitude more complicated than the next-most-complicated communication system outside of the human sphere. And they are indeed almost impossibly difficult for other species to acquire" (1997, p. 40).

Also, consider that when language first appears on the scene, it already is fully developed and very complex. The late Harvard paleontologist George Gaylord Simpson described it this way:

> "Even the peoples with least complex cultures have highly sophisticated languages, with complex grammar and large vocabularies, capable of naming and discussing anything that occurs in the sphere occupied by their speakers. The oldest language that can be reconstructed is already modern, sophisticated, complete from an evolutionary point of view" (1966, p. 477).

Chomsky summed it up well when he stated,

> "Human language appears to be a unique phenomenon, without significant analogue in the animal world…. There is no reason to suppose that the 'gaps' are bridgeable. There is no more of a basis for assuming an evolutionary development from breathing to walking" (1972, pp. 67-68).

The fact of the matter is, language is quintessentially a human trait. All attempts to shed light on the evolution of human language have failed—due to the lack of knowledge regarding the origin of **any** language, and due to the lack of an animal that possesses any "transitional" form of communication. This leaves evolutionists with a huge gulf to bridge between humans with their innate communication abilities, and the grunts, barks, and chatterings of animals. Deacon lamented,

> "So this is the real mystery. Even under these loosened criteria, there are no simple languages used among other species, though there are many other equally or more complicated modes of communication.

> Why not? And the problem is even more counterintuitive when we consider the almost insurmountable difficulties of teaching language to other species. This is surprising, because there are many clever species. Though researchers report that languagelike communication has been taught to nonhuman species, even the best results are not above legitimate challenges, and the fact that it is difficult to prove whether or not some of these efforts have succeeded attests to the rather limited scope of the resulting behaviors, as well as to deep disagreements about what exactly constitutes language-like behavior" (1997, p. 41).

Evolutionist R.L. Holloway, in an article on "Paleoneurological Evidence for Language Origins" written for the New York Academy of Sciences, recognized this gaping chasm between humans and animals, and admitted, "The very fact… that human animals are ready to engage in a great 'garrulity' over the merits and demerits of essentially unprovable hypotheses, is an exciting testimony to the gap between humans and other animals" (1976, 280:330). Toward the end of his book, as Deacon was summarizing the conundrum, he noted,

> "Evolution has widened the cognitive gap between the human species and all others into a yawning chasm. Taken together, the near-universal failure of nonhumans and the near-universal success of humans in acquiring symbolic abilities suggests that this shift corresponds to a major reassignment of cognitive resources to help overcome natural barriers to symbol learning. Other species' failures at symbol learning do not result from the lack of some essential structure present only in human brains. As we have seen, chimpanzees can, under special circumstances, be brought to understand symbolic communication, though at best on a comparatively modest scale" (p. 412).

Should you be suspicious when someone says that language evolved? In his paper titled "A Physicist Looks at Evolution," British physicist H.S. Lipson put it well when he wrote,

> "I have always been slightly suspicious of the theory of evolution because of its ability to account for any property of living things (the long neck of the giraffe, for example). I have therefore tried to see whether biological discoveries over the last thirty years or so fit in with Darwin's theory. I do not think that they do. To my mind, the theory does not stand up at all" (1980, 31:138).

NON-EVOLUTIONIST'S FIFTH AFFIRMATIVE: THE MYSTERY OF THE ORIGIN OF CONSCIOUSNESS

When speaking of consciousness (also referred to in the literature as "self-awareness"), evolutionists freely admit that, from their vantage point at least, "consciousness is one's most precious possession" (Elbert, 2000, p. 231). David MacKay of the University of Keele in England wrote, "[Consciousness is] for us, the most important aspect of all" (1965, p. 498). Paleoanthropologist Richard Leakey stated the issue like this: "The sense of self-awareness we each experience is so brilliant it illuminates everything we think and do..." (1994, p. 139).

In the book, *Evolution*, that the late geneticist Theodosius Dobzhansky and his co-authors authored, they admitted, "In point of fact, **self-awareness is the most immediate and incontrovertible of all realities.** Without doubt, the human mind sets our species apart from nonhuman animals" (Dobzhansky, et al., 1977, p. 453, emp. added). Ervin Laszlo, in his volume, *Evolution: The Grand Synthesis*, commented,

> "**The phenomenon of mind is perhaps the most remarkable of all the phenomena of the lived and experienced world**. Its explanation belongs to a grand tradition of philosophy—to the perennial 'great questions' that each generation of thinkers answers anew...or despairs of answering at all" (1987, p. 116, ellipsis in orig., emp. added).

The late Robert Wesson, who was a much-respected Hoover Institution Senior Research Fellow, observed in his book, *Beyond Natural Selection,*

> "Life has a dual nature: its material basis and the essence of functionality and responsiveness that distinguishes living things and flourishes at higher levels of evolution. **The material and the mental are both real**, just as are causation and will. The mind derives richness from these two sides, like feeling and bodily function, love and sex, the spiritual and the carnal, the joy of creation and the satisfaction of bodily wants" (1997, p. 278, emp. added).

Or, as philosopher Michael Ruse remarked, "**The important thing from our perspective is that con-**

sciousness is a real thing. We are sentient beings" (2001b, p. 200, emp. added). Sir Cyril Hinshelwood, professor of chemistry at the Imperial College in London, commented, "I almost hesitate to say this in a scientific gathering; but one does just wonder **what would be the point or purpose of anything at all if there were not consciousness anywhere?**" (1965, p. 500, emp. added).

Non-evolutionists certainly agree. In his work, *Understanding the Present: Science and the Soul of Modern Man*, Bryan Appleyard observed,

> "Light, gravity, even the whole biological realm, are related to us only in the most superficial way: we reflect light, if dropped we fall and we have a body system roughly comparable to a large number of animals. **All of which is trivial compared with the one attribute we have that is denied to the rest of nature—consciousness**" (1992, pp. 193-194, emp. added).

Yes, consciousness is a "real thing." But why is it an "important thing"? Stephen J. Gould concluded,

> "Consciousness, vouchsafed only to our species in the history of life on earth, **is the most god-awfully potent evolutionary invention ever developed**. Although accidental and unpredictable, it has given *Homo sapiens* unprecedented power both over the history of our own species and the life of the entire contemporary biosphere" (1997, p. ix, emp. added).

With consciousness has come the ability to control—well—**almost everything**! But with that "unprecedented power" also has come unprecedented responsibility because, as even evolutionists are wont to admit, actions have consequences. Well-known evolutionist Donald Griffin, in the 2001 revised edition of his classic text, *Animal Minds: Beyond Cognition to Consciousness*, admitted as much when he wrote,

> "It is self-evident that we are aware of at least some of what goes on around us and that we think about our situation and about the probable results of various actions that we might take. **This sort of conscious subjective mental experience is significant and useful because it often helps us select appropriate behavior**" (p. ix, emp. added).

"Selecting appropriate behavior" (or, as the case may be, **not** selecting appropriate behavior) becomes a key point in this discussion. As evolutionists John Eccles and Daniel Robinson correctly observed in *The Wonder of Being Human: Our Brain and Our Mind*, "Whether one takes human beings to be 'children of God,' 'tools of production,' 'matter in motion,' or 'a species of primate' has consequences" (1984, p. 1). Yes, it certainly does.

The "Mystery" of Human Consciousness

Consciousness is undeniably real. But **admitting** that turns out to be the easy part. The difficulty arises in explaining **why**—why consciousness exists; why it is real; why it works the way it does; why it has consequences; etc. When it comes to explaining the origin of consciousness, evolutionists concede (to use their exact words), "Clearly, we are in deep trouble" (Eccles and Robinson, 1984, p. 17). Just how "deep" that "trouble" really is, appears to be one of the most widely known—yet best-kept—secrets in the history of science. In a chapter ("The Human Brain and the Human Person") that he authored for the book, *Mind and Brain: The Many-faceted Problems*, Sir John Eccles wrote, "The emergence and development of self-consciousness...is an utterly mysterious process.... The coming-to-be of self-consciousness is a mystery that concerns each person with its conscious and unique selfhood" (1982, pp. 85,97). Or, as British physicist Sir John Polkinghorne put it, "The human psyche has revealed its shadowy and elusive depths" (1986, p. 5).

Consider the following admissions from those within the evolutionary community; and as you do, notice the descriptive terms (like "problem," "mystery," "puzzle," "riddle," "challenge," etc.) that generally are employed in any discussion of consciousness.

> "**Consciousness is the highest manifestation of life, but as to its origin, destiny, and the nature of its connection with the physical body and brain—these are as yet unsolved metaphysical questions**, the answer to which can only be found by continued research in the direction of higher physical and psychical science" (Carrington, 1923, p. 54, emp. added).

> "**The emergence of full consciousness...is indeed one of the greatest of miracles**" (Popper and Eccles,

1977, p. 129, emp. added).

> "We believe that **the emergence of consciousness is a skeleton in the closet of orthodox evolutionism**.... It remains just as enigmatic as it is to an orthodox evolutionist as long as it is regarded as an exclusively natural process in an exclusively materialist world" (Eccles and Robinson, 1984, pp. 17,18, emp. added).

> "What the connection, or the relationship, is between what goes on mentally in the mind and what goes on physically in the brain, nobody knows. Perhaps we shall never know. **The so-called mind/brain problem has proved so elusive, many have come to regard it as a mystery of ultimate significance**.... Unlike less-complicated physical structures, **the brain is accompanied by consciousness. As we said earlier, we do not know why this should be**. For the time being at least, we must simply accept it as a brute fact" (Stannard, 2000, pp. 41-42,44, emp. added).

Consciousness Defined

The past three decades have witnessed a serious and noticeable increase in interest in the subject of consciousness, accompanied by a surge of publications, new scientific and/or philosophical journals, and scientific meetings (for examples within the last few years see: Greenfield, 2002; Tolson, 2002; Lemonick, 2003a, 2003b; Pinker, 2003).

One would think that since so much has been written on the topic of consciousness, surely the definition of this oft'-discussed issue would be a straightforward, simple matter. Think again! [One dictionary on psychology offered the following entry under "consciousness": "Consciousness is a fascinating but elusive phenomenon; it is impossible to specify what it is, what it does or why it evolved. Nothing worth reading has been written about it" (Sutherland, 1989).] Scientists and philosophers frequently cannot even agree on the definition of the term, much less on the origin of that which they are attempting to define.

Our English word "consciousness" has its roots in the Latin *conscio*, formed by the coalescence of *cum* (meaning "with") and *scio* (meaning "know"). In its original Latin sense, to be conscious of something was to share knowledge of it, with someone else, or with oneself. Consciousness, however, has become a rather ambiguous term in its everyday usage. It can refer to: (1) a waking state; (2) experience; and (3) the possession of any mental state. It may be helpful to the reader to provide an example of each of these three usages: (1) the injured worker lapsed into unconsciousness; (2) the criminal became conscious of a terrible sense of dread at the thought of being apprehended; and (3) I am conscious of the fact that sometimes I get on your nerves. Anthony O'Hear suggested,

> "In being conscious of myself as myself, I see myself as separate from what is not myself. In being conscious, a being reacts to the world with feeling, with pleasure and pain, and responds on the basis of felt needs.... Consciousness involves reacting to stimuli and feeling stimuli" (1997, pp. 22,38).

The phrase "self-consciousness," at times, can be equally ambiguous, as it may include: (1) proneness to embarrassment in social settings; (2) the ability to detect our own sensations and recall our recent actions; (3) self-recognition; (4) the awareness of awareness; and (5) self-knowledge in the broadest sense (see Zeman, 2001, 124:1264). O'Hear went on to suggest,

> "A self-conscious person, then, does not simply have beliefs or dispositions, does not simply engage in practices of various sorts, does not just respond to or suffer the world. He or she is aware that he or she has beliefs, practices, dispositions, and the rest. It is this awareness of myself as a subject of experience, as a holder of beliefs, and an engager in practices, which constitutes my self-consciousness. A conscious animal might be a knower, and we might extend the epithet 'knower' to machines if they receive information from the world and modify their responses accordingly. **But only a self-conscious being *knows* that he is a knower**" (pp. 23-24, emp. and italics added).

Neurobiologist Antonio Damasio believes that consciousness comes in two different forms. First is "**core consciousness**," which is limited to the here and now, and is what we share with other higher primates. The second, which is the ingredient humans possess that makes us unique, he has labeled as "**extended consciousness**." This type of consciousness adds awareness of past and future to the mix (see Tattersall, 2002, p. 73). Nobel laureate Gerald Edelman, director of neurosciences and chairman of the department of neurobiology at the Scripps Research Institute (1992, pp. 117-123), believes we should dis-

tinguish between what he calls "primary consciousness" (equivalent to Damasio's "core consciousness") and "higher-order consciousness" (equivalent to Damasio's "extended consciousness"). [Stanford University biologist Paul Ehrlich prefers the terms "consciousness" and "intense consciousness" (2000, pp. 110-112).]

What is involved in the transition from primary to higher consciousness is that the one who is the subject of such consciousness does not merely "have" experiences, but also is able, over and above that, to refine, alter, and report on those experiences. Primary consciousness lacks any notion of an experience or self. In other words, a "non-self-conscious" creature is aware of and/or able to react to stimuli. But higher-order consciousness represents an awareness of the plans, ideas, and concepts by which one makes one's way in the world.

Ian Tattersall commented, "...[I]f consciousness were something more susceptible to scientific analysis than it is, we would certainly know a lot more about it by now than we do—which is very little indeed" (p. 59). Donald Johanson and Blake Edgar, in their book, *From Lucy to Language*, admitted that "consciousness, being inherently singular and subjective, is a tricky prospect for objective scientific analysis..." (1996, p. 107). Perhaps. But Richard Leakey was at least willing to inquire, "What **is** consciousness? More specifically, what is it **for**? What is its **function**? Such questions may seem odd, given that each of us experiences life through the medium of consciousness, or self-awareness" (1994, p. 139, emp. in orig.).

Indeed, such questions **do** seem a bit odd, considering all the media attention given to the subject of consciousness over the past many years. But, as Adam Zeman wrote in an extensive review of consciousness that he prepared for the July 2001 issue of the scientific journal, *Brain*, "Whether scientific observation and theory will yield a complete account of consciousness remains a live issue" (124:1264). A "live issue" indeed! Just getting scientists and philosophers to agree on a standard, coherent definition seems to be an almost impossible task. In his 1997 volume, *The Large, the Small and the Human Brain*, British mathematical physicist Sir Roger Penrose asked, "**What is consciousness? Well, I don't know how to define it. I think this is not the moment to attempt to define consciousness, since we do not know what it is**..." (p. 98, emp. added; Penrose's central thesis is that consciousness must be "something outside of **known** physics," p. 102).

But the fact that "we do not know what it is" has not prevented people from offering a variety of definitions for "our most precious possession"—consciousness. Johanson and Edgar went on to say,

> "First, **what is consciousness? No single definition may suffice for such an elusive concept**, but we can describe consciousness as self-awareness and self-reflection, the ability to feel pain or pleasure, the sensation of being alive and of being us, the sum of whatever passes through the mind" (p. 107, emp. added).

Their suggestion that "no single definition may suffice for such an elusive concept" has been echoed by several others who have broached the puzzle of consciousness. Canadian psychologist Merlin Donald, in his book, *A Mind So Rare*, commented,

> "[W]e must mind our definition of consciousness. It is not really a unitary phenomenon, and allows more than one definition. In fact, it encompasses at least three classes of definition. The first is the definition of consciousness as a **state**.... A second class of functional definition takes an **architectural** approach, whereby consciousness is defined as a place in the mind.... The third definition of consciousness takes a frankly human-centered view of cognition and has more to do with enlightenment, or illumination, than with mere attention. This is the **representational** approach..." (2001, pp. 118,119,120, emp. in orig.).

For University of Washington neurobiologist William Calvin, consciousness consists of "contemplating the past and forecasting the future, planning what to do tomorrow, feeling dismay when seeing a tragedy unfold, and narrating our life story." For Cambridge University psychologist Nicholas Humphrey, an essential part of consciousness is "raw sensation." According to Steven Harnad, editor of the respected journal, *Behavioral and Brain Sciences*, "consciousness is just the capacity to have experiences" (for documentation of statements by Calvin, Humphrey, and Harnad, see Lewin, 1992, pp. 153-154). And, even though Roger Penrose started out by admitting, "I don't know how to define it; I think this is not the mo-

ment to attempt to define consciousness, since we do not know what it is," that did not prevent him from offering up his own set of definitions for consciousness.

> "It seems to me that there are at least two different aspects to consciousness. On the one hand, there are **passive** manifestations of consciousness, which involve **awareness**. I use this category to include things like perceptions of colour, of harmonies, the use of memory, and so on. On the other hand, there are its **active** manifestations, which involve concepts like free will and the carrying out of actions under our free will" (1997, pp. 98-99, emp. in orig.).

Notice how often "consciousness" seems to be tied to "awareness"/"self-awareness"? There's a reason for that: the terms frequently are used interchangeably in the scientific and philosophical literature. Eccles noted, "One can also use the term self-awareness instead of self-consciousness, but I prefer self-consciousness because it relates directly to the self-conscious mind" (1992, p. 3). Stanford University biologist Robert Ornstein, in *The Evolution of Consciousness*, suggested, "**Being conscious *is being aware of being aware***. It is one step removed from the raw experience of seeing, smelling, acting, moving, and reacting" (1991, pp. 225-226, italics and emp. added).

Paul Ehrlich, in *Human Natures: Genes, Cultures, and the Human Prospect*, also addressed the intriguing concept of "self" consciousness.

> "We have a continuous sense of 'self'—of a little individual sitting between our ears—and, perhaps equally important, a sense of the threat of death, of the potential for that individual—our self—to cease to exist. I call all of this sort of awareness '**intense consciousness'; it is central to human natures and is perhaps the least understood aspect of those natures**" (2000, p. 110, emp. added).

And, last but certainly not least, let it be noted that even though certain scientists and philosophers do not know what consciousness **is**, they apparently know what it **is not**. As evolutionary humanist Jerome W. Elbert put it in his book, *Are Souls Real?*,

> "We can define consciousness as **what it is like to be a person who is awake or dreaming and has a normally functioning brain**.... By our definition, consciousness is interrupted by dreamless sleep, and it returns when we awaken or have a dream. By almost anyone's definition, consciousness leaves when a person is under general anesthetic during surgery. The fact that consciousness can be halted and restarted is evidence that it is due to the operation of a process, rather than the presence of a **spiritual entity**. This is consistent with the view that consciousness arises from a dynamic process within the brain, rather than from the presumable continuous indwelling of a soul" (2000, p. 223, emp. in orig.).

Or, to quote Roger Penrose, "I am suggesting that **there are not mental objects floating around out there which are not based in physicality"** (1997, p. 97, emp. added). So much, then, for the idea that self-consciousness or self-awareness might possibly have a non-empirical explanation. Strict adherence to the reductionistic concept of naturalism demands at the outset that such an option be discarded by definition.

Why—And How—Did Consciousness Arise?

When Sir Karl Popper and Sir John Eccles stated in their classic text, *The Self and Its Brain*, that "**the emergence of full consciousness...is indeed one of the greatest of miracles**," they did not overstate the case (1977, p. 129). Be sure to notice their use of the word "emergence." The "miracle" of the "emergence" of consciousness has to do with two things: (1) the **reason** for its existence; and (2) the **fact** of its existence. In other words, **why** did consciousness arise, and **how** did it do so?

Why Did Consciousness Arise?

From the outset, let us state what is accepted as common knowledge (and what is just as readily admitted) within the scientific community: **evolutionary theory cannot begin to explain *why* consciousness arose**. In my estimation, one of the most fascinating books published within the last thirty-five years was a volume with the seemingly unprofessional title, *The Encyclopaedia of Ignorance* (see Duncan and Weston-Smith, 1977). But, although the title may appear somewhat whimsical, the content of the volume is anything but. In chapter after chapter, distinguished, award-winning scientists (such as Nobel laureate Sir Francis Crick, and two-time Nobel laureate Linus Pauling) enunciated and explained some of the most

important things in the world—**things of which science is completely ignorant**. Interestingly, one of the chapters in the book, written by Richard Gregory (professor of neuropsychology and director of the brain and perception laboratory at the University of Bristol in England), was "Consciousness." In his discussion, Dr. Gregory asked,

> "Why, then, do we **need** consciousness? What does consciousness have that the neural signals (and physical brain activity) do not have? Here there is something of a paradox, for if the awareness of consciousness does not have any effect—if consciousness is not a causal agent—then it seems useless, and so should not have developed by evolutionary pressure. If, on the other hand, it is useful, it must be a causal agent: but then physiological description in terms of neural activity cannot be complete. Worse, we are on this alternative stuck with mentalistic explanations, which seem outside science" (1977, p. 277, parenthetical item and emp. in orig.).

In his assessment, Gregory isolated several key points.

- First, what does consciousness have that the brain does not?
- Second, if consciousness does not have some "real function," then, obviously, nature would have "selected against" it—and it never would have appeared in the first place.
- Third, if consciousness does indeed have some function, in light of our knowledge about how the neural network of the brain operates, **what is that function** (and if there is beneficial function, why haven't the brains of animals selected for it)?

To echo Gregory's question, "Why do we **need** consciousness?" Good question. Philosopher Michael Ruse noted some of the major hurdles involved in "nature" being able to "select" for consciousness when he inquired,

> "Even if one agrees that consciousness is in some sense connected to or emergent from the brain—and how could one deny this?—**consciousness must have some biological standing in its own right**.... But what is consciousness, and what function does it serve? Why should not an unconscious machine do everything that we can do?" (2001a, p. 72, emp. added).

Some materialists, of course, have suggested that a machine **can** do "everything we can do." The eminent British physiologist Lord E.D. Adrian, in the chapter he authored on "Consciousness" for the book, *Brain and Conscious Experience*, concluded, "As far as our public behavior is concerned, **there is nothing that could not be copied by machinery, nothing therefore that could not be brought within the framework of physical science**" (1965, p. 240, emp. added). [Lord Adrian's remarks were made at a scientific symposium held at the Vatican during the week of September 28-October 4, 1964. Following his speech, the seminar participants engaged in a roundtable discussion that centered on Adrian's lecture. One of those in attendance was the renowned Canadian neurosurgeon Wilder Penfield, who dryly responded to Lord Adrian, "I had in mind to ask whether the robot could, in any conceivable way, see a joke. I think not. Sense of humor would, I suspect, be the last thing that a machine would have" (as quoted in Eccles, 1966, p. 248). A brilliant stroke! So much for a machine being able to do everything humans can do.]

Evolutionary theory has no adequate answer to the question of how consciousness arose, as evolutionists Eccles and Robinson admitted when they wrote,

> "[A]ll materialist theories of the mind are in conflict with biological evolution.... Evolutionary theory holds that only those structures and processes that significantly aid in survival are developed in natural selection. **If consciousness is causally impotent, its development cannot be accounted for by evolutionary theory**" (1984, p. 37, emp. added).

Or, as Gregory had noted years earlier,

> "If the brain was developed by Natural Selection, we might well suppose that consciousness has survival value. But for this it must, surely, have causal effects. **But what effects could awareness, or consciousness, have?**" (1977, p. 276, emp. added).

Evolutionists may not be able to explain what causal effect(s) consciousness might possibly have that would endow it with a "survival value" significant enough for "nature" to "select," but one thing is certain: **most of them are not willing to go so far as to suggest that consciousness does not exist, or that it is unimportant to humanity**. As Ruse put it,

> "The average evolutionist, however, particularly the average Darwinian, feels extremely uncomfortable with such a dismissive attitude. **Consciousness seems a very important aspect of human nature**. Whatever it may be, consciousness is so much a part of what it is to be human that Darwinians are loath to say that natural selection had no or little role in its production and maintenance" (2001b, pp. 197, emp. added).

While the "average evolutionist" may indeed be "extremely uncomfortable" with the suggestion that natural selection had "no or little role in the production and maintenance of consciousness," the truth of the matter is that no Darwinian can explain **why**, or **how**, natural selection **could have played *any part whatsoever* in such a process**. Yet, as Richard Heinberg observed in his book, *Cloning the Buddha: The Moral Impact of Biotechnology*,

> "Since no better material explanation is apparently available, it is assumed that whatever explanation is at hand—however obvious its shortcomings—**must be** true. Natural selection thus becomes an inscrutable, godlike agency capable of producing miracles" (1999, p. 71, emp. in orig.).

From an evolutionary viewpoint, consciousness doesn't **do** anything. It doesn't "help" the neural circuits in the brain. It apparently doesn't have any "great biological significance," and it doesn't seem to bestow any innate "survival benefit" on its possessor. It therefore would seem appropriate to ask, then: **What is left?!** Or, to repeat Gregory's question, "Why do we **need** consciousness?"

Why Do We Need Consciousness?

From an evolutionary viewpoint, maybe we **don't** need consciousness. W.H. Thorpe, in his chapter, "Ethology and Consciousness" (written for the book, *Brain and Conscious Experience*), asked regarding consciousness, "Is there a good selective reason for it, or is there just no reason at all why the animal should not have got on quite as well without having developed this apparently strange and new faculty?" (1965, p. 497). Perhaps, amidst all the other "happenstances" resulting from billions of years of evolution, consciousness is, to put it bluntly, a "quirky accident." Ironically (or maybe not), those are the exact words the late evolutionist Stephen J. Gould used to describe the origin of consciousness when he said,

> "The not-so-hidden agenda in all this is a concern with human consciousness. You can't blame us for being fascinated with consciousness; it's an enormous punctuation in the history of life. **I view it as a quirky accident**" (as quoted in Lewin, 1992, pp. 145-146, emp. added).

Theodosius Dobzhansky suggested,

> "Self-awareness is, then, one of the fundamental, and possibly the most fundamental, characteristic of the human species. **This characteristic is an evolutionary novelty**; the biological species from which mankind has descended had only rudiments of self-awareness, or perhaps lacked it altogether" (1967, p. 68).

An "exceptional evolutionary novelty?" Truth be told, it is **so** exceptional that some evolutionists have given up altogether trying to figure out why consciousness exists in the first place. One such prominent figure in the field is British philosopher Colin McGinn. In speaking about McGinn's views on evolutionists' inability to explain the origin of consciousness, James Trefil wrote in his book, *Are We Unique?*,

> "Others have suggested more esoteric arguments about the fundamental unknowability of consciousness. For example, philosopher Colin McGinn of Rutgers University has suggested, on the basis of an argument from evolutionary theory, that the human mind is simply not equipped to deal with this particular problem. His basic argument is that **nothing in evolution has ever required the human mind to be able to deal with the operation of the human brain**" (1997, p. 186, emp. added).

In Paul Ehrlich's volume, *Human Natures: Genes, Cultures, and the Human Prospect*, he discussed this particular situation as well when he remarked that McGinn doubts

> "...that we will ever understand how a pattern of electrochemical impulses in our nervous systems is

> translated into the rich experience of, say, watching an opera or flying an airplane. He believes that **our minds did not evolve in such a way as to enable us to answer that question, which may be fated to remain unanswered for a very long time, if not forever**" (2000, p. 112).

However, one thing remains certain: consciousness does indeed appear to be connected to the brain. Yet such an observation causes as many problems as it does solutions, as Gregory observed.

> "We believe that consciousness is tied to living organisms: especially human beings, and more particularly to specific regions of the human brain.... This in turn generates the question: 'What is the relation between consciousness and the matter or functions of the brain?' ...One trouble about consciousness is that it cannot be (or has not yet been) isolated from brains, to study it in different contexts" (1977, pp. 274,276, parenthetical item in orig.).

Richard Leakey chimed in to agree when he wrote,

> "The most obvious change in the hominid brain in its evolutionary trajectory was, as noted, a tripling of size. Size was not the only change, however; the overall organization changed, too. **...This difference in organization presumably underlies in some way the generation of the human mind** as opposed to the ape mind. If we knew when the change in configuration occurred in human prehistory, we would have a clue about the emergence of human mind" (1994, pp. 145, emp. added).

One widely held view regarding the jump from the three pounds of matter inside a human skull being "just" a brain, to the type of complex brain that permits and/or produces consciousness, appears to be that once the brain reached a certain size, consciousness more or less just "tagged along for the ride." Or, as Ruse hypothesized,

> "General opinion (my opinion!) is that somehow, as brains got bigger and better during animal evolution, consciousness started to emerge in a primitive sort of way. Brains developed for calculating purposes and **consciousness emerged and, as it were, got dragged along**. Most Darwinians think that at some point, consciousness came into its own right" (2001b, pp. 197-198, parenthetical comment in orig., emp. added).

There are, however, a number of "alternative explanations" for why the brain ultimately developed consciousness. Gregory listed just a few (out of a sizable number) when he said,

> "It has been suggested that: (1) mind and brain are not connected (epiphenomenalism); or (2) that the brain generates consciousness; or (3) that consciousness drives the brain; or (4) that they both work in parallel (like a pair of identical clocks) without causal connection" (1977, p. 279, parenthetical items in orig.).

Then again, there are those who are not quite so ecstatic about the concept of increased brain size being solely responsible for something as important and quixotic as consciousness. For example, in his book, *Complexity: Life at the Edge of Chaos*, Roger Lewin observed,

> "I found many biologists distinctly uncomfortable with talking about increase in brain size as a measure of complexity. 'I'm hostile to all sorts of mystical urges toward great complexity,' said Richard Dawkins when I asked him whether an increase in computational complexity might be considered an inevitable part of the evolutionary process. 'You'd like to think that being able to solve problems contributes to Darwinian fitness, wouldn't you?,' said John Maynard Smith. 'But it's hard to relate increased brain size to fitness. After all, bacteria are fit' " (1992, p. 146).

Steven Pinker, the eminent psychologist from MIT, is no happier with the idea that "a big brain explains it all" than some of the rest of his evolutionary colleagues. In *The Language Instinct*, he lamented,

> "**A large-brained creature is sentenced to a life that combines all the disadvantages of balancing a watermelon on a broomstick, running in place in a down jacket, and for women, passing a large kidney stone every few years. Any selection on brain size itself would surely have favored the pinhead**. Selection for more powerful computational abilities (language, perception, reasoning, and so on) must have given us a big brain as a by-product—not the other way around!" (1994, pp. 374-375, parenthetical items in orig., emp. added).

Furthermore, "brain size," as it turns out, does not live up to its vaunted reputation. Brain size and intellect among living people have been thoroughly explored by, among others, such scientists as evolutionist W. LeGros Clark, who reported that skulls from humans of normal intelligence vary in cranial capacity

anywhere from 900cc to 2,300 cc. In fact, Dr. Clark discussed one completely normal human being whose brain size was a mere 720 cc (see Clark, 1958, pp. 357-360, Howe, 1971, p. 213).

If natural selection did not "choose" consciousness (because it has no "causal effects"), if consciousness (from an evolutionary point of view) has no known function , and if "evolving a big brain" is not an adequate explanation for consciousness—then, to repeat the original question, **why did consciousness arise in the first place**? What does it **do**?

Some evolutionists have suggested that consciousness arose "so that people could process language." But, as Wright noted,

> "People who claim to have a scientific answer usually turn out to have misunderstood the question. For example, some people say that consciousness arose so that people could process language.... But, whatever it may feel like, the (often unspoken) premise of modern behavioral science is that when you are in conversation with someone, all the causing happens at a physical level. That someone flaps his or her tongue, generating physical sound waves that enter your ear, triggering a sequence of physical processes in your brain that ultimately result in the flapping of your own tongue, and so on. In short: the **experience** of assimilating someone's words and formulating a reply is superfluous to the assimilation and the reply, both of which are just intricate mechanical processes" (2000, p. 307, parenthetical item and emp. in orig.).

Peter Wilson asked,

> "But how is self-consciousness possible?...We might choose to cite certain suggestions that language is the prerequisite, for it is only with the aid of language that we can find the way to give reality, by articulation to the inchoate intuition of the divided self. But language may play this role only in a mechanical sense, by providing a means of **expressing** and **symbolizing** consciousness" (1980, pp. 85-86, emp. in orig.).

"Expressing" and "symbolizing" consciousness, however, are not the same as "explaining" consciousness.

Alwyn Scott, in his book, *Stairway to the Mind: The Controversial New Science of Consciousness*, suggested that "consciousness gives an evolutionary advantage to the species that develops it" (1995, p. 162). **But what, specifically, might that advantage be?** W.H. Thorpe chose the simplest option of all: "The production of consciousness may have been an evolutionary necessity, in that it may have been the only way in which highly complex living organisms could become fully viable" (1965, p. 493). Adam Zeman, in the review of the subject of consciousness that he wrote for the journal, *Brain*, chose a different tact: "[I]t can be argued, at a conceptual level, that the concept of one's own mind presupposes the concept of other minds" (2001, 124:1281). In an article that Nicholas Humphrey wrote for *New Scientist* titled "Nature's Psychologists" seized on that thought (as he did later in his book, *A History of the Mind*) to provide one example of the types of theories that have been proposed to explain the "evolutionary advantage" of consciousness. He suggested that the purpose of consciousness is to allow "social animals" to model another's behavior on the basis of their insight into another creature's psychological motivation. In other words, our knowledge of our own mental states supplies us with insight into the mental states underlying the actions of others—which then: (a) provides us with the ability to predict what someone else is likely to do; and (b) thereby becomes a major determinant of our own biological success (1978). Or, as Paul Ehrlich asked,

> "What could have been the selective advantage that led to the evolution of intense consciousness? This type of consciousness helps us to maneuver in a complicated society of other individuals, each of whom is also intensely conscious. Intense consciousness also allows us to play without acting out the plans and to consider that other individuals probably also are planning" (2000, p. 113).

Not to be outdone, Merlin Donald, in *A Mind So Rare*, offered up his own supposition. "Conscious capacity," he wrote, "may be seen as an evolutionary adaptation in its own right, whose various functions have evolved to optimize or boost cognitive processing" (2001, p. 131). [Ah, yes—"optimizing cognitive processing." And exactly how would consciousness (which, as Dr. Eccles admitted, is "causally impotent") accomplish that?] Then, last, but certainly not least, Ruse weighed in with his guess.

> "Slowly but positively, brain scientists do feel that they are groping toward some understanding of the virtues of consciousness, over and above the operation of blind automata. It is felt that **consciousness may act as a kind of filter and guide—coordinating all the information thrown up by the brain**. Consciousness helps to prevent the brain from getting overloaded, as happens all too often with computers. Consciousness regulates experience, sifting through the input, using some and rejecting some and storing some..." (2001b, p. 198, emp. added).

Thus, consciousness, so we are told: (a) acts a filter or guide to coordinate all the information thrown up by the brain; (b) prevents the brain from getting overloaded; (c) regulates experience; (d) sifts through input into the brain; and (d) rejects some experience and stores others. Pretty impressive achievements, wouldn't you say, for the nebulous "something" referred to as "consciousness" that, supposedly, "natural selection had no or little role in producing" (Ruse), "is causally impotent" (Eccles), "is fundamentally unknowable" (McGinn), and "is not a causal agent" (Gregory). And that, in turn, brings us to the next question.

How Did Consciousness Arise?

It is not enough to ask **why** consciousness arose. One also must inquire as to **how** consciousness originated. In *Man: The Promising Primate*, Peter Wilson asked,

> "[H]ow is it possible for one species, the human, to develop consciousness, and particular self-consciousness, to such a degree that it becomes of critical importance for the individual's sanity and survival? And what is the meaning of this development in and for human evolution?" (1980, p. 84).

Human consciousness is so pervasive, and so undeniable, that the mechanism of its existence **must** be explained. But how? One practically can envision Stephen J. Gould shrugging his shoulders in exasperation, and sighing in frustration, as he admitted, "...[W]e must view the evolution of human consciousness as a lucky accident that occurred only by the fortunate (for us) concatenation of numerous improbabilities" (1984, p. 64, parenthetical item in orig.). Five years later, he continued in the same vein when he wrote, "*Homo sapiens* may form only a twig, but if life moves, even fitfully, toward greater complexity and higher mental powers, then the eventual origin of self-conscious intelligence may be implicit in all that came before" (1989, p. 45). After another five years had passed, he wrote,

> "*Homo sapiens* did not appear on the earth, just a geologic second ago, because evolutionary theory predicts such an outcome based on themes of progress and increasing neural complexity. Humans arose, rather, as a fortuitous and contingent outcome of thousands of linked events, any one of which could have occurred differently and sent history on an alternative pathway that would not have led to consciousness" (1994, 271[4]:86).

Then, two years later, in his book, *Full House: The Spread of Excellence from Plato to Dar*win, Dr. Gould concluded,

> "If a large extraterrestrial object—the ultimate random bolt from the blue—had not triggered the extinction of dinosaurs 65 million years ago, mammals would still be small creatures, confined to the nooks and crannies of a dinosaur's world, and incapable of evolving the larger size that brains big enough for self-consciousness require. If a small and tenuous population of protohumans had not survived a hundred slings and arrows of outrageous fortune (and potential extinction) on the savannas of Africa, then *Homo sapiens* would never have emerged to spread throughout the globe. **We are glorious accidents of an unpredictable process with no drive to complexity, not the expected results of evolutionary principles that yearn to produce a creature capable of understanding the mode of its own necessary construction**" (1996, p. 216, parenthetical item in orig., emp. added).

As convenient as it may be to surmise that consciousness is the result of a "contingent outcome of thousands of linked events," or a "glorious accident," such speculation does not even come close to explaining **how** consciousness arose. So how **did** it arise?

On occasion (quite often, in fact), evolutionists have been known to criticize non-evolutionists for their reliance on what evolutionists see as "just-so" stories (a phrase borrowed from Rudyard Kipling's children's book of the same title, in which fanciful explanations are offered for adaptations, such as the elephant's trunk). But, as the old adage suggests, "The sauce that is good for the goose also is good for

the gander." Or, to put it another way, evolutionists are not above weaving their own "just-so" stories—when it suits their purpose. For example, Stephen J. Gould—effective popularizer of evolution that he was—spun a fascinating tale of how he thought consciousness evolved. By his best guess, **human consciousness is rooted in the destruction of the dinosaurs** 65-70 million years ago as the result of a giant asteroid hitting the Earth and driving them to extinction (1996, p. 216).

Does this strike you as a bit odd? Does it leave you wondering exactly how the dinosaurs' demise could possibly account for, of all things, **human consciousness**? If so, you are not alone. Little wonder, then, that Dr. Gould concluded in an article ("The Evolution of Life on the Earth") that he authored for the October 1994 issue of *Scientific American*, "*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" (271[4]:91).

As far as Gould and many of his colleagues are concerned, *Homo sapiens* may be nothing but a "tiny twig" or a "small bud." But human consciousness ("our most precious possession," "the greatest of miracles") has defied every attempt by evolutionists to explain either the reason for its existence or the mechanism leading to its development. Further complicating matters is the obvious and undeniable fact that our consciousness/self-awareness allows us to experience (and express!) what Roger Penrose has referred to as "non-computable elements"—things like compassion, morality, and many others—that "mere neural activity" is extremely hard pressed to explain. As Dr. Penrose put it,

> "There are some types of words which would seem to involve non-computable elements—for example, judgement, common sense, insight, aesthetic sensibility, compassion, morality.... These seem to me to be things which are not just features of computations.... If there indeed exists some sort of contact with Platonic absolutes which our awareness enables us to achieve, and which cannot be explained in terms of computational behaviour, then **that seems to me to be an important issue**" (1997, p. 125, first ellipsis in orig., second ellipsis and emp. added).

An important issue? Talk about understatement! It is difficult enough to try to invent "just-so" stories to explain **why** consciousness arose in the first place, and then to explain **how** it did so. But to try to explain the role that consciousness plays in such "important issues" within humanity as common sense, judgment, aesthetics, compassion, and morality—well, let's just say that Michael Ruse had it right when he observed, "I hardly need say that **all of these suggestions raise as many questions and problems as they answer**" (2001b, pp. 199-200, emp. added). Anthony O'Hear, in *Beyond Evolution: Human Nature and the Limits of Evolutionary Explanation*, expressed his opinion regarding these matters when he wrote, "What is crucially at issue here is not how human self-consciousness might have come about, but what its significance is once it has come about" (1997, p. 22).

In a special April 10, 2000 issue of *Time* magazine devoted to the subject, "Visions of Space and Science," Steven Pinker, professor of brain and cognitive sciences at MIT, and author of *How the Mind Works*, produced an article, "Will the Mind Figure Out How the Brain Works?," in which he concluded,

> "Will we ever understand the brain as well as we understand the heart, say, or the kidney? Will mad scientists or dictators have the means to control our thoughts? Will neurologists scan our brains down to the last synapse and duplicate the wiring in a silicon chip, giving our minds eternal life?
>
> "No one can say. The human brain is the most complex object in the known universe, with billions of chattering neurons connected by trillions of synapses. No scientific problem compares to it. (The Human Genome Project, which is trying to read a long molecular sentence composed of billions of letters, is simple by comparison.)... **One challenge is that we are still clueless about how the brain represents the content of our thoughts and feelings**" (2000, 155[4]:91, parenthetical comment in orig., emp. added).

Or, as brain researcher John Beloff admitted in an article he wrote on "The Mind-Brain Problem," "The fact is that, leaving aside mythical and religious cosmologies, **the position of mind in nature remains a total mystery**.... At present there is no agreement even as to what would count here as decisive evidence" (1994, emp. added).

I would like to close this discussion about **how** consciousness arose with the following statements from Bryan Appleyard.

> "Hard science will fight back at this point by attempting to deny this is a problem at all. Self-consciousness is merely a by-product of evolutionary complexity. Animals develop larger brains as survival mechanisms. Over millions of years these brains attain awesome levels of miniaturization and organization; indeed, they become the most complicated things in the universe. Then, one day, this complexity gives rise to something utterly unprecedented.... The reason such explanations feel inadequate, even though, as children of the scientific age, we probably accept them at the back of our minds, is that they are incoherent. **They do not explain self-consciousness, they explain complexity.**
>
> "Of course, the hard evolutionist may still respond by claiming that this is a by-product of complexity. The elaborations and anomalies of our language and our awareness are merely a kind of surplus capacity to idle that happens to occur in the brain.... In reality, they are trivial—in the words of Peter Atkins they are 'special but not significant.'
>
> "But, again, this is incoherent. How can it be 'not significant' that we are able to use and understand the words 'not significant'? What meaning can the word "significant" have in such a context? Significant to what? **If self-consciousness is 'not significant,' then where on earth is significance to be found?**" (1992, pp. 194,195-196, emp. added).

Well said! If human consciousness does not rank as being "significant," **what does**?

Evolutionary Bias and the Origin of Human Consciousness

Bias is a difficult thing to admit. It also is a difficult thing to overcome. Donald Johanson, in his book, *Lucy: The Beginnings of Humankind* (which discusses *Australopithecus afarensis*, arguably the best-known hominid fossil in the world), addressed this issue in an admirably candid manner when he wrote, "There is no such thing as a total lack of bias. I have it; everybody has it." But Dr. Johanson did not stop there. Instead, he went on to note, "**The insidious thing about bias is that it does make one deaf to the cries of other evidence**" (Johanson and Edey, 1981, p. 277, emp. added). That is especially true when it comes to cosmogonies (world views).

Evolutionists' Total Reliance Upon Naturalism

Atheistic philosopher Paul Ricci candidly admitted in his book, *Fundamentals of Critical Thinking*, "[E]ither a divine being exists or he does not; there are no third possibilities, regardless of what the skeptic or agnostic says" (1986, p. 140). So, once a person has committed himself [for whatever reason(s)] to a wholly reductionistic theory of naturalism, where does that leave him? First (and perhaps most obviously), empiricism alone becomes the sole judge and jury regarding…well…**everything**.. As Paul Kurtz explained in the chapter on "Scientific Humanism" that he produced for his book, *The Humanist Alternative*,

> "To adopt such a scientific approach unreservedly is to accept as ultimate in all matters of fact and real existence the appeal to the evidence of experience alone—a court subordinate to no higher authority, to be over-ridden by no prejudice however comfortable" (1973, p. 109, emp. added).

Harvard geneticist Richard Lewontin explained the implications of such a view quite well when he wrote,

> "We take the side of science *in spite* of the patent absurdity of some of its constructs, *in spite* of its failure to fulfill many of its extravagant promises of health and life, *in spite* of the tolerance of the scientific community for unsubstantiated just-so stories, because **we have a prior commitment, a commitment to naturalism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes** to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for **we cannot allow a Divine Foot in the door**" (1997, p. 31, italics in orig., emp. added).

Second, a purely naturalistic system of origins **must** be invoked to explain…well…**everything**! As British evolutionist Sir Francis Crick put it, "The ultimate aim of the modern movement in biology is in fact to explain **all** of biology in terms of physics and chemistry" (1966, p. 10, emp. added). Six years earlier, another British evolutionist, Sir Julian Huxley, had commented, "The earth was not created; it

evolved. So did all the animals and plants that inhabit it, including our human selves, mind and soul as well as brain and body" (1960, pp. 252-253).

Such a position, however, is not without severe problems—as the issue I am discussing here (the origin of consciousness) demonstrates all too clearly. When individuals limit themselves to the purely naturalistic explanations offered by organic evolution, they find themselves implacably constrained in regard to how to explain human consciousness—what Popper and Eccles called "the greatest of miracles."

Evolutionists—restricted by an *a priori* devotion to solely naturalistic explanations—**must** find a way for organic evolution to explain **everything** that exists (which certainly would include human consciousness). Emil du-Bois-Reymand (1818-1896), the founder of electrochemistry, and Hermann von Helmholtz (1812-1894), the famed German physiologist and physicist who was the first to measure the speed of nerve impulses, agreed with such an assessment when they wrote, "**All** the activities of living material, including consciousness, are ultimately to be explained in terms of physics and chemistry" (as quoted in Leake, 1964, sec. 4, pp. 5-6, emp. added). Robert Ornstein, in *The Evolution of Consciousness*, said that our mind "**evolved on the same adaptive basis as the rest of biological evolution**, using the processes of random generation and selection of what is so generated.... The story of the mind lies in many accidents and many changes of function" (1991, pp. 4-5, emp. added). Colin McGinn put the matter in perspective (from a reductionistic/naturalistic standpoint) when he lamented,

> "**Resolutely shunning the supernatural**, I think it is undeniable that it must be in virtue of *some* natural property of the brain that organisms are conscious. There just *has* to be some explanation for how brains [interact with] minds" (1993, p. 6, italics in orig., emp. added).

When McGinn says, "There just *has* to be some explanation for how brains interact with minds," what he means, of course, is that there just *has* to be some **naturalistic** explanation. Ian Glynn, in his book, *An Anatomy of Thought: The Origin and Machinery of the Mind*, followed the same line of thinking when he explained,

> "My own starting position can be summed up in three statements: first, that the only minds whose existence we can be confident of are associated with complex brains of humans and some other animals; second, that we (and other animals with minds) are the product of evolution by natural selection; and, third, that **neither in the origin of life nor in its subsequent evolution has there been any supernatural interference—that is, anything happening contrary to the laws of physics**" (1999, p. 5, emp. added).

The commitment to materialism and naturalism evinced by such statements is all-encompassing. Claude Bernard, the progenitor of modern physiology, believed that the cause of **all** phenomena is **matter**, and that determinism is "the foundation of all scientific progress and criticism" (as quoted in Kety, 1960, 132:1863). Thomas Huxley reflected such a view when he observed, "Thoughts are the expression of molecular changes in the matter of life, which is the source of our other vital phenomena" (1870b, p. 152). Huxley also said, "Mind is a function of matter, when that matter has attained a certain degree of organization" (1871, p. 464). He therefore concluded, "Thought is as much a function of matter as motion is" (1870a, p. 371).

This type of irrational devotion to materialism has not set well with some revered members of the scientific community. Probably most prominent among them was John Carew Eccles who, until his death in 1997 at the age of 94, was one of the world's most-eminent electrophysiologists. He graduated from Oxford in 1929 with a D.Phil. (the British equivalent of an American Ph.D.) after having matriculated (on a Rhodes scholarship) under Nobel laureate Sir Charles Sherrington—the man Eccles himself once called "the greatest neuroscientist of the age" (Eccles, 1994, p. 13). Dr. Eccles served as a professor of physiology at Australian National University from 1952-1966, was knighted by Queen Elizabeth II in 1958, and five years later in 1963 won the Nobel Prize in Medicine or Physiology (shared with Alan L. Hodgkin and Andrew F. Huxley) for his research on the biophysical properties of synaptic transmission. Among neuro- or electrophysiologists, few if any of his generation were his equal.

In fact, Dr. Eccles was the main subject of an article ("Scientists in Search of the Soul") that John Gliedman wrote for *Science Digest*. At the beginning of that article, Gliedman wrote,

> "From Berkeley to Paris and from London to Princeton, prominent scientists from fields as diverse as neurophysiology and quantum physics are coming out of the closet and **admitting they believe in the possibility, at least, of such unscientific entities as the immortal human spirit and divine creation**" (1982, 90[7]:77, emp. added).

One of the scientists discussed at some length by Mr. Gliedman was Sir John Eccles, of whom Gliedman wrote:

> "At age 79, Sir John Eccles is not going "gentle into the night." Still trim and vigorous, the great physiologist has declared war on the past 300 years of scientific speculation about man's nature. Winner of the 1963 Nobel Prize in Physiology or Medicine for his pioneering research on the synapse—the point at which nerve cells communicate with the brain—**Eccles strongly defends the ancient religious belief that human beings consist of a mysterious compound of physical and intangible spirit.... Our nonmaterial self controls its "liaison brain" the way a driver steers a car or a programmer directs a computer. Man's ghostly spiritual presence, says Eccles, exerts just the whisper of a physical influence on the computerlike brain, enough to encourage some neurons to fire and others to remain silent**. Boldly advancing what for most scientists is the greatest heresy of all, Eccles also asserts that our nonmaterial self survives the death of the physical brain" (p. 77, emp. added).

While there are many other things could be said about Dr. Eccles and the various honors and awards that were bestowed upon him during his lengthy and impressive professional career, these undoubtedly are enough to convince the reader of his qualifications to speak on the subjects that he is about to address below, among which are his personal scientific research on consciousness, as well as his views on reductionistic materialism. When it came to naturalism and/or materialism, Eccles was quite outspoken. In his book, *The Wonder of Being Human: Our Brain and Our Mind*, he wrote,

> "When such troubles arise in the history of thought, it is usual to adopt some belief that 'saves' the day. For example, the denial of the reality of mental events, as in radical materialism, is an easy cop-out.... **Radical materialism should have a prominent place in the history of human silliness**" (Eccles and Robinson, 1984, p. 17, emp. added).

How very refreshing! And the fact that such statements came from a Nobel laureate who was an admitted evolutionist, is, to say the very least, surprising. But Dr. Eccles is not alone in such thinking. The eminent British theoretical physicist (and former Master of Queen's College, Cambridge), Sir John Polkinghorne, expressed similar thoughts in an article he wrote in 2001 ("Understanding the Universe") for publication in the *Annals of the New York Academy of Sciences*.

> "Those of us privileged to be scientists are so excited by the quest to understand the workings of the physical world that we seldom stop to ask ourselves why we are so fortunate. **Human powers of rational comprehension vastly exceed anything that could be simply an evolutionary necessity for survival, or plausibly construed as some sort of collateral spin-off from such a necessity**....
>
> "I believe that science is possible because the physical world is a creation and we are, to use an ancient and powerful phrase, creatures "made in the image" of the Creator.... With, for example, Paul Davies in his book *The Mind of God*, **I cannot regard this dawning of consciousness as being just a fortunate accident in the course of an essentially meaningless cosmic history**....
>
> "What I have sought to show is that religious believers who see a divine Mind and Purpose behind the universe are not shutting their eyes and irrationally believe impossible things. **We have reason for our beliefs**. They have come to us through that search for motivated understanding that is so congenial to the scientist" (950:177,178,179,182, emp. added).

When Dr. Polkinghorne said, in speaking of people such as himself and Dr. Eccles, "We have reasons for our beliefs…that have come to us through that search for motivated understanding that is so congenial to the scientist," he did not overstate the case. Dr. Eccles spent much of his scientific career studying the matter of consciousness, and was, during his lifetime, one of the world's foremost experts on that topic. In his Gifford Lectures (presented at the University of Edinburgh in 1977-1978), he told those who were present,

> "We must not claim to be self-sufficient. **If we espouse the philosophy of monist-materialism, there is**

> **no base on which we can build a meaning for life or for the values**. We would be creatures of chance and circumstance. All would be determined by our inheritance and our conditioning. Our feeling of freedom and of responsibility would be but an illusion. As against that I will present my belief that **there is a great mystery in our existence and in our experiences of life that is not explicable in materialist terms**" (1979, p. 10, emp. added).

Eccles (and his co-author Robinson) later wrote, "We reject materialism because, as we have seen, it doesn't **explain** our concepts but **denies** them" (1984, p. 173, emp. added). Dr. Eccles therefore concluded,

> "The arguments presented by [American biologist H.S.] Jennings **preclude me from believing that my experiencing self has an existence that merely is derivative from my brain** with its biological origin, and with its development under instructions derived from my genetic inheritance" (1967, p. 24, emp. added).

Without Naturalism/Monistic Materialism, What Is Left?

After one has rightly rejected monistic materialism, what, then, is left? That is where Dr. Eccles' scientific research enters the picture. By way of initially summarizing that research for those who might not be familiar with it, I would like to introduce the following quotation from a chapter that Norman Geisler authored for the book, *The Intellectuals Speak Out About God* (which, by the way, also contained a chapter by Dr. Eccles). Geisler wrote,

> "The extreme form of materialism believes that mind (or soul) **is** matter. More modern forms believe mind is *reducible to* matter or *dependent on* it. However, from a scientific perspective much has happened in our generation to lay bare the clay feet of materialism. Most noteworthy among this is the Nobel Prize winning work of Sir John Eccles. **His work on the brain demonstrated that the mind or intention is more than physical. He has shown that the supplementary motor area of the brain is fired by mere intention to do something, without the motor cortex of the brain (which controls muscle movements) operating. So, in effect, the mind is to the brain what an archivist is to a library. The former is not reducible to the latter**" (1984, pp. 140-141, parenthetical item and italics in orig., emp. added).

Eccles, and his lifelong friend, Sir Karl Popper, the famed British philosopher of science, viewed the mind as a distinctly **non-material** entity. **But neither did so for religious reasons!** Dr. Eccles was a committed Darwinian evolutionist (as was Popper). Rather, **they believed what they did about the human mind because of scientific research!** Speaking specifically of human self-consciousness, Eccles wrote,

> "It is dependent on the existence of a sufficient number of such critically poised neurons, and, consequently, only in such conditions are willing and perceiving possible. However, it is not necessary for the whole cortex to be in this special dynamic state.... On the basis of this concept [activity of the cortex] we can face up anew to the extraordinary problems inherent in a strong dualism—interaction of brain and conscious mind, brain receiving from conscious mind in a willed action, and in turn transmitting to mind in conscious experiences.... **Let us be quite clear that for each of us the primary reality is our consciousness—everything else is derivative and has a second-order reality**. We have tremendous intellectual tasks in our efforts to understand baffling problems that lie right at the center of our being" (1966, pp. 312,327, bracketed item and emp. added).

Dr. Eccles spent much of his adult life studying the brain-mind problem, and concluded that the two were entirely separate entities. In a book (*Nobel Conversations*) containing interviews with four Nobel laureates (including three—Ilya Prigogine, Roger Sperry, and Brian Josephson—who held similar scientific views to those of Dr. Eccles on the origin of the mind and consciousness), Norman Cousins (the esteemed editor of the *Saturday Review* for more than a quarter of a century, and the man who served as the moderator for the interviews), made the following statement: "Nor was Sir John Eccles claiming too much when **he insisted that the action of non-material mind on material brain has been not merely postulated, but *scientifically demonstrated***" (1985, p. 68, italics and emp. added). Eccles himself, in his book, *The Understanding of the Brain*, wrote,

> "When I postulated many years ago, following [Sir Charles] Sherrington, that there was a special area of the brain in liaison with consciousness, I certainly did not imagine that any definitive experimental test could be applied in a few years. But now we have this distinction between the dominant hemisphere in liaison with the conscious self, and the minor hemisphere with no such liaison" (1973, p. 214).

What an amazing statement from the man who constructed many of the pillars on which modern neuroanatomy and electrophysiology now stands! Cousins continued:

> "**Eccles is the one who showed that the mental acts of intention *initiate* the burst of discharges in a nerve's brain cell**. He has tried to re-enfranchise the human mind, to get science to recognize thinking as a more comprehensive human activity than the mere operation of neural mechanisms.... [B]oth of you [Eccles and Sperry] have reached **your conclusions through the rigorous discipline of the laboratory. If you are persuaded that mental realities initiate and direct biochemical reactions in the brain, it is scientific experimentation, not philosophical speculation, that has convinced you"** (1985, pp. 56, 21,57, italics in orig., emp. added).

What, precisely, is the relationship between mind and brain? Eccles answered as follows:

> "How can the mental act of intention activate across the mind-brain frontier those particular SMA [supplementary motor area] neurons in the appropriate code for activating the motor programs that bring about intended voluntary movements? The answer is that, **despite the so-called 'insuperable' difficulty of having a non-material mind act on a material brain, it has been demonstrated to occur by a mental intention—no doubt to the great discomfiture of all materialists and physicalists**" (as quoted in Cousins, 1985, pp. 55-56, emp. in orig., bracketed material added).

> "**[W]e have discovered that mental intentions act upon the SMA in a highly selective, discriminating manner**. In a fashion which is not yet fully understood, mental intentions are able to activate across the mind-brain frontier those *particular* SMA neurons that are coded for initiating the specialized motor programs that cause voluntary movements. As I remarked earlier, this may present an "insuperable" difficulty for some scientists of materialist bent, **but the fact remains, and is demonstrated by research, that non-material mind acts on material brain**" (as quoted in Cousins, 1985, pp. 61-62,85-86, italics in orig., emp. added).

In *The Wonder of Being Human: Our Brain and Our Mind*, Eccles and Robinson discussed the research of three groups of scientists (Robert Porter and Cobie Brinkman, Nils Lassen and Per Roland, and Hans Kornhüber and Luder Deecke), all of whom produced startling and undeniable evidence that a "**mental intention" preceded an actual neuronal firing—thereby establishing that the mind is not the same thing as the brain, but is a separate entity altogether** (1984, pp. 156-164, emp. added). As Eccles and Robinson concluded:

> "But it is impressive that many of the samples of several hundred SMA [supplementary motor area] nerve cells were firing probably about one-tenth of a second **before** the earliest discharge of the pyramidal cells down to the spinal cord.... Thus there is strong support for the hypothesis that the SMA is the sole recipient area of the brain for mental intentions that lead to voluntary movements" (pp. 157,160, emp. in orig., bracketed material added).

Interestingly, Eccles was not the first to document this type of independence in regard to the mind's action on the brain, as he himself conceded.

> "Remarkable series of experiments in the last few years have transformed our understanding of the cerebral events concerned with the initiation of a voluntary movement. It can now be stated that the first brain reactions cause by the **intention to move** are in nerve cells of the **supplementary motor area** (SMA). It is right at the top of the brain, mostly on the medial surface. This area was recognized by the renowned neurosurgeon Wilder Penfield when he was stimulating the exposed human brain in the search for epileptic 'foci' (regions of aberrant activity associated with epileptic seizures)" [Eccles and Robinson, 1984, p. 156, parenthetical items and emp. in orig.].

In 1961 Canadian neurosurgeon Wilder Penfield reported a dramatic demonstration of the reality of the active mind at work. He observed mind acting independently of the brain under controlled experimental conditions that were reproducible at will (see Penfield, 1961; 1975; Custance, 1980, p. 19). Dr. Pen-

field's patient suffered from epilepsy, and had one hemisphere of his temporal lobe exposed from a previous surgery. Penfield reported,

> "When the neurosurgeon applies an electrode to the motor area of the patient's cerebral cortex, causing the opposite hand to move, and when he asks the patient why he moved the hand, the response is: 'I didn't do it. You made me do it.'...It may be said that the patient thinks of himself as having an existence separate from his body. Once when I warned a patient of my intention to stimulate the motor area of the cortex, and challenged him to keep his hand from moving when the electrode was applied, he seized it with the other hand and struggled to hold it still. Thus one hand, under the control of the right hemisphere driven by an electrode, and the other hand, which he controlled through the left hemisphere, were caused to struggle against each other. **Behind the 'brain action' of one hemisphere was the patient's mind**. Behind the action of the other hemisphere was the electrode" (as quoted in Koestler, 1967, pp. 203-204, emp. added).

Penfield went on to conclude,

> "But what is it that calls upon these mechanisms, choosing one rather than another? Is it another mechanism or is there in the mind something of different essence? To declare that these two are one does not make them so. But it does block the progress of research" (p. 204).

Upon closing his surgical practice, Dr. Penfield wrote,

> "Throughout my own scientific career, I, like the other scientists, have struggled to prove that the brain accounts for the mind. But now, perhaps, the time has come when we may profitably consider the evidence as it stands, and ask the question: Do brain-mechanisms account for the mind? **Can the mind be explained by what is now known about the brain? If not, which is more reasonable of the two possible hypotheses: *that man's being is based on one element, or on two?*"** (1975, p. xiii, emp. and italics added).

Penfield's final observations caused him to reflect as follows:

> "This is the correct scientific approach for a neurophysiologist: to try to prove that the brain explains the mind and that mind is no more than a function of the brain. But during this time of analysis, **I found no suggestion of action by a brain-mind mechanism that accounts for mind-action**....
>
> "In the end I conclude that there is **no good evidence**, in spite of new methods, such as the employment of stimulating electrodes, the study of conscious patients, and the analysis of epileptic attacks, **that the brain alone can carry out the work that the mind does. I conclude that it is easier to rationalize man's being on the basis of two elements than on the basis of one**" (1975, pp. 104,114, emp. added).

These are the words of a physician who studied the brain for decades, and who collected and analyzed the data firsthand. In *The Mystery of the Mind*, Penfield concluded that the mind might very well be "**a distinct and different essence**" (1975, p. 62, emp. added). Based on the available scientific evidence, I wholeheartedly agree. A.O. Gomes, in his chapter, "The Brain-Consciousness Problem in Contemporary Scientific Research," for the book, *Brain and Conscious Experience*, wrote,

> "...[R]esearch is frequently conducted as if the whole occurrences under study were ultimately nothing more than the transformations of some physiological events into others; the mental phenomena involved are either ignored or given only a secondary importance. ...How can physical sense receptors affect sense? **How can a reaction in the brain condition a reaction in the mind?** How can the (often quoted!) 'enchanted loom' of nerve impulses in the brain, which always weaves meaningful, but never abiding, patterns—how can this 'loom' evoke such rich mental experiences as the vision of everything we see, all the sounds we hear, all the bodily sensations we may ever become aware of?" (1965, p. 448, 446, parenthetical item in orig., emp. added).

In the book (mentioned earlier) containing four Nobel laureates' conversations on these matters, Norman Cousins commented, "The question naturally arises: **Where do mental intentions come from, what is their source, their origin**?" (1985, pp. 66-67, emp. added). These "mental intentions" are truly important, as Ian Tattersall admitted when he wrote, "Everybody can agree that a major aspect of consciousness is the ability to form intentions; and nobody will dispute that human beings spend much of their lives in this activity, however hollow those intentions may eventually turn out to be" (2002, p. 58).

So how did Dr. Eccles answer the question of where these mental intentions originate? He responded, "In contrast to these materialist or parallelist theories are the ***dualist-interaction theories***. **The essential feature of these theories is that mind and brain are independent entities**..." (Eccles and Robinson, 1984, p. 35, italics and emp. added). By way of summary, here is Dr. Eccles' view:

> "The self-conscious mind is actively engaged in reading out from the multitude of active centers at the highest level of brain activity, namely, the liaison modules that are largely in the dominant cerebral hemisphere. The self-conscious mind selects from these modules according to attention and interest, and from moment to moment integrates its selection to give unity even to the most transient experiences. Furthermore, the self-conscious mind acts upon these neural centers modifying the dynamic spatiotemporal patterns of the neural events. **Thus it is proposed that the self-conscious mind exercises a superior interpretative and controlling role upon the neural events**.... The present hypothesis regards the neuronal machinery as a multiplex of radiating and receiving structures: **the experienced unity comes, not from a neurophysiological synthesis, but from the proposed integrating character of the self-conscious mind**" (1982, pp. 244-245, emp. added).

It was the concept of the "self-conscious mind" to which Dr. Eccles devoted his life's research, and on which he spoke and wrote so often. In fact, during his invited lecture at the 1975 Nobel Conference he reminded his fellow Nobel laureates,

> "There is the continual experience that the self-conscious mind can **effectively** act on the brain events. This is most overtly seen in voluntary action, but throughout our waking life we are deliberately evoking brain events when we try to recall a memory or to recapture a word or phrase or to express a thought or to establish a new memory. This hypothesis gives a prime role to the action of the self-conscious mind, an action of choice and searching and discovering and integrating.... **A key component of the hypothesis is that the unity of conscious experience is provided by the self-conscious mind and not by the neural machinery of the liaison areas of the cerebral hemisphere**.... Furthermore, the active role of the self-conscious mind is extended in our hypothesis to effect changes in the neuronal events. Thus not only does it read out selectively from the on-going activities of the neuronal machinery, but **it also modifies these activities**" (1977, pp 81,82,83, emp. in orig.).

Eccles then concluded by saying,

> "**There must be a partial independence of the self-conscious mind from the brain events with which it interacts**. For example, if a decision is to be freely made it must be initiated in the self-conscious mind and then communicated to the brain for executive action. This sequence is even more necessary in the exercise of creative imagination, where **flashes of insight become expressions by triggering appropriate brain actions**" (p. 87, emp. in orig.).

How, then, would Dr. Eccles categorize himself? He certainly did not fit the description of a monist-materialist. Was he then a strict dualist? Did he consider himself a vitalist? What position did he take as a result of his fascinating, Nobel Prize-winning discoveries and later scientific research? In his book, *The Human Mystery*, he quelled any suspicions when he wrote,

> "If I should be asked to express my philosophical position, I would have to admit that I am an animist on Monod's definition. As a dualist I believe in the reality of the world of mind or spirit as well as in the reality of the material world. Furthermore I am a finalist in the sense of believing that there is some Design in the processes of biological evolution that has eventually led to us self-conscious beings with our unique individuality; and we are able to contemplate and we can attempt to understand the grandeur and wonder of nature, as I will attempt to do in these lectures" (1979, pp. 9-10).

Eventually, Sir John Eccles came to refer to himself as a "dualist-interactionist" (as did Sir Karl Popper). In fact, Eccles calmly admitted,

> "**As a dualist-interactionist, I believe that my experienced uniqueness lies not in the uniqueness of my brain, but in my psyche**. It is built up from the tissue of memories of the most intimate kind from my earliest recollection onwards to the present.... It is important to disclaim a solipsistic solution of the uniqueness of the self. Our direct experiences are of course subjective, being derived solely from our brain and self. The existences of other selves *are established* by intersubjective communication" (1992, p. 237, italics in orig., emp. added).

Popper and Eccles presented their views and research in their massive 600-page book published in 1977, *The Self and Its Brain: An Argument for Interactionism*, which became an overnight sensation (and ultimately a classic in its field). In his portion of that volume, Popper wrote,

> "**But the human consciousness of self transcends, I suggest, all purely biological though**t.... [O]nly a human being capable of speech can reflect upon himself. I think that every organism has a programme. **But I also think that only a human being can be conscious of parts of this programme, and revise them critically**" (1977, p. 144, emp. added).

Four years before that book's publication, Eccles went on record as stating,

> "I was a dualist, now I am a **trialist**! Cartesian dualism has become unfashionable with many people. They embrace monism in order to escape the enigma of brain-mind interaction with its perplexing problems. But Sir Karl Popper and I are interactionists, and what is more, **trialist interactionists**!" (1973, p. 189, emp. in orig.).

In the section that he wrote for *The Self and Its Brain*, Popper discussed his view (shared by Eccles) that reality should be seen as having three different aspects, which he subsequently labeled as World I, World II, and World III. World I is the objective world of **physical entities**. World II is the subjective psychic **inner reality** of each human being. World III is the world of **human culture** (i.e., the world of ideas). Popper and Eccles both agreed that "**the self-conscious mind is an independent entity to be superimposed upon the neural machinery**"—a superimposition that can lead to a variety of interactions in the brain as it moves between Worlds I, II, and III. Continuous subjective interactions exist between World I and World II, as well as cultural interactions affecting both World I and World II.

Dr. Eccles himself performed numerous experiments in which nerve cells in the SMA discharged—solely as a result of mental intention—**before** the cells responsible for motor activity. And, on numerous occasions he discussed the scientific evidence substantiating that the mind is a separate entity from the brain—evidence that he had gathered through a lifetime of study on the brain-mind problem (see Eccles, 1973, 1979; 1982; 1984; 1989, 1992, 1994). Dr. Eccles thus concluded: "**We are a combination of two things or entities: our brains on the one hand, and our conscious selves on the other**" (1984, p. 33, emp. added).

Could Popper and Eccles be onto something here? Could there be a "world," within each human, containing a "psychic inner reality"? Jay Tolson, in an article ("The Ghost Hunters") that he penned for the December 16, 2002 issue of *U.S. News & World Report*, used humans' ability to employ symbolic language (in a way that no animal can) to inquire about "a person beneath the personality."

> "Using language at its most refined limit—irony—shows how we often mean something more or other than what we say. **Might that not be a tantalizing glimpse of a self beyond the mere representation of the self, a person beneath the personality?** A ghost in the machine, after all?" (133[23]:46, emp. added).

As Paul Davies was constrained to ask,

> "Can the mind somehow reach into the physical world of electrons and atoms, brain cells and nerves, and create electrical forces? Does mind really act on matter in defiance of the fundamental principles of physics? **Are there, indeed, two causes of movement in the material world: one due to ordinary physical processes and the other due to mental processes?**" (1983, pp. 75, emp. in orig.).

While the committed monist-materialist would answer "no" to Dr. Davies' questions, the scientific research of men such as Eccles, Penfield, and others answers "yes" to each of them. Considering the available empirical evidence which documents that mind **does** interact with matter (the brain), what other conclusion could one possibly reach? As Eccles put it, "These considerations lead me to the alternative hypothesis of dualist-interactionism. **It is really the commonsense view, namely that we are a combination of two things or entities: our brains on the one hand; and our conscious selves on the other**" (1982, pp. 88, emp. added). Herbert Feigl, in his book, *The "Mental" and the "Physical,"* admitted,

> "Vitalists or interactionists...hold that biological concepts and laws are not reducible to the laws of physics, and hence—*a fortiori*—that psychological concepts and laws are likewise irreducible.... The upshot of this longish discussion on the difference between the scientific and the philosophical components of

> the mind-body problem is this: **If interactionism or any genuine emergence hypotheses are sensibly formulated, they have empirical content and entail incisive limitations of the scope of physical determinism**" (1967, pp. 7,18, emp. added).

Not long after Feigl admitted that interactionism hypotheses, if "sensibly formulated," could have "empirical content," Sir John Eccles came along and "sensibly formulated" his dualist-interactionist theory—and then provided the "empirical content" to go along with it. And where does such "empirical content" lead? Eccles, Penfield, and others have shown empirically that **mind exists independently of matter!**

"A Universal Mind"?

The thought, then, of a "universal mind" that stands behind this Universe no longer sounds quite so far-fetched. Shortly before British astronomer Sir Arthur Eddington died, he concluded, "The idea of a universal mind, or Logos, would be, I think, a fairly plausible inference from the present state of scientific theory" (as quoted in Heeren, 1995, p. 233). Or, as well-known brain researcher John Beloff put it in his article on "The Mind-Brain Problem,"

> "...**[T]he position of mind in nature remains a total mystery. It could be that there exists some sort of a cosmic mind, perhaps co-equal with the material universe itself, from which each of our individual minds stems and to which each ultimately returns**. All we can say is that it looks as if a fragment of mind-stuff becomes attached to an individual organism, at or near birth, and thereafter persists with this symbiotic relationship until that organism perishes" (1994, emp. added).

Harvard's Nobel laureate, George Wald, in the chapter he wrote ("The Cosmology of Life and Mind") for *New Metaphysical Foundations of Modern Science*, addressed this very theme.

> "I had already for some time taken it as a foregone conclusion that the mind—consciousness—could not be located. It is essentially absurd to think of locating a phenomenon that yields no physical signals, the presence or absence of which, outside of humans their like, cannot be identified.
>
> "But further than that, mind is not only not locatable, it **has no location**. It is not a **thing** in space and time, not measurable; hence, as I said at the beginning of this chapter, not assimilable as science. And yet it is not to be dismissed as an epiphenomenon: it is the foundation, the condition that makes science possible....
>
> "A few years ago it occurred to me that these seemingly very disparate problems might be brought together. And this could happen through the hypothesis that **mind**, rather than being a very late development in the evolution of living things, restricted to organisms with the most complex nervous systems—all of which I had believed to be true—**has been there always. And that this universe is life-breeding because the pervasive presence of mind had guided it to be so**" (1994, pp. 128,129, emp. added).

Dr. Wald was in good company in sensing what he called "the pervasive presence of mind." Over seventy years ago, British physicist Sir James Jeans wrote,

> "Today there is a wide measure of agreement which on the physical side of science approaches almost unanimity, that the stream of knowledge is heading towards a non-mechanical reality: the Universe begins to look more like a great thought than a great machine. **Mind no longer looks like an accidental intruder into the realm of matter; we are beginning to suspect that we ought rather to hail it as the Creator and governor of the realm of matter**.... We discover that the Universe shows evidence of a designing or controlling Power that has something in common with our own minds" (1930, emp. added).

In a discussion in their college biology textbook, *The New Biology*, about the origin of the genetic code, Robert Augros and George Stanciu asked,

> "What cause is responsible for the origin of the genetic code and directs it to produce animal and plant species? It cannot be matter because of itself matter has no inclination to these forms, any more than it has to the form Poseidon or the form of a microchip or any other artifact. **There must be a cause apart from matter that is able to shape and direct matter. Is there anything in our experience like this? Yes, there is: our own minds**. The statue's form originates in the mind of the artist, who then subsequently shapes matter, in the appropriate way.... **For the same reasons there must be a mind that directs and shapes matter in organic forms**" (1987, p. 191, emp. added).

Or, to quote NASA astronomer Robert Jastrow, "That there are what I, or anyone would call supernatural forces at work is now, I think, a scientifically proven fact" (1982, p. 18).

Physicist Freeman Dyson authored an article ("Mankind's Place in the Cosmos") for *U.S. News and World Report* in which he noted,

> "The mind, I believe, exists in some very real sense in the universe. But is it primary or an accidental consequence of something else? The prevailing view among biologists seems to be that the mind arose accidentally out of molecules of DNA or something. I find that very unlikely. **It seems more reasonable to think that mind was a primary part of nature from the beginning and we are simply manifestations of it at the present stage of history"** (1988, p. 72, emp. added).

Then, with an even bolder tact, Arne Wyller dared to inquire in his book, *The Creating Consciousness*, "**What if there existed a mind before people...**perhaps a consciousness we will one day find in another part of the Universe, perhaps a universal consciousness field: **The Planetary Mind**?" (1996, p. 223, emp. added).

Just think. "What if" there existed a mind before people—a "universal/planetary/cosmic Mind Who could "attach a fragment of mind-stuff" to an individual organism at conception? Just think! As Richard Heinberg remarked,

> "But at least the spiritual view leaves open the door for the possibility that our explanations for biological phenomena are still incomplete in some fundamental way. To prematurely close that door might be a profound error. If we think we have essentially the whole picture of what life is and how it works, when in reality we have only a part of that picture; if our working philosophy systematically excludes certain kinds of evidence and certain kinds of explanations; and further, if we act on our philosophy in ways that have global repercussions, then we could be getting ourselves into serious trouble indeed. A spiritual perspective, even in its weakest and most generalized form, would hold that **present material explanations for biological and psychological realities are necessary but not sufficient. Something else must be taken into account"** (1999, pp. 74-75, emp. added).

That "something else" of which Heinberg wrote is the "cosmic mind," "universal mind," or "mind that existed before people," of which the writers above spoke. And such writers are not the only ones to acknowledge the necessity of such. As Jerome Elbert correctly noted, "The soul belief is so basic in our culture that, through ordinary communications, most of us come to believe that a network of neurons cannot, by itself, generate our thoughts and awareness of the world" (2000, p. 217). How very true.

Conclusion

In speaking about attempts by naturalistic theories of origins to explain **sexual reproduction** in nature, Graham Bell admitted in his book, *The Masterpiece of Nature: The Evolution of Genetics and Sexuality*, that such a problem "represents the most important challenge to the modern theory of evolution" (1982, book jacket). He then went on to say that "sex is the queen of problems in evolutionary biology" (p. 19).

If sex is the "**queen** of problems in evolutionary biology," there can be no doubt whatsoever that the origin of consciousness holds the well-earned title of "the **king** of problems in evolutionary biology." Bell's observation that the origin of sexual reproduction "represents the most important challenge to the modern theory of evolution" was premature. The origin of consciousness undeniably now occupies that vaunted spot.

But why so? There are at least two reasons. First, as evolutionists themselves freely admit, **consciousness is important to each of us!** Jerome Elbert called it "one's most precious possession" (2000, p. 231), and Johanson and Edgar almost blushingly observed that consciousness "adds layers of richness to our lives" (1996, p. 107). Little wonder that Stephen J. Gould called it (from his perspective) the "most god-awfully potent evolutionary invention ever developed" (1997, p. ix), or that Erwin Laszlo referred to it as "perhaps the most remarkable of all the phenomena of the lived and experienced world" (1987, p. 116). Can you imagine going through life **without** consciousness?! [Or, as Sir Cyril Hinshelwood (quoted earlier) asked, "**What would be the point or purpose of anything at all if there were not consciousness anywhere?**" (1965, p. 500, emp. added).]

Second, evolutionists likewise admit that they have no viable theory that even begins to adequately explain the origin of consciousness. As Jerry Fodor conceded, "**Nobody has the slightest idea how anything material could be conscious**. Nobody even knows what it would be like to have the slightest idea about how anything material could be conscious" (1992, p. 5, emp. added). The origin/presence of consciousness is, as Johanson and Edgar confessed, "biology's most profound riddle" (1996, p. 107, emp. added).

One therefore cannot help but wonder: What does the theory of organic evolution possess to commend itself as being worthy of acceptance when it cannot explain "the most god-awfully potent invention ever developed," "humanity's most precious possession," and "the most remarkable of all the phenomena of the lived and experienced world"? To ask is to answer, is it not?

[NOTE: There was not room here to discuss the various naturalistic theories (past or present) relating to the origin of consciousness. However, such an in-depth discussion is available for those who would like to study the matter further. See: Harrub, et al. (2003), *The Truth About Human Origins* (Montgomery, AL: Apologetics Press).]

CONCLUSION

In the early summer of 2009 when I, as a non-evolutionist, was invited to participate in an online debate regarding the alleged factuality of organic evolution, the affirmative proposition that I was asked to defend was as follows:

> **RESOLVED**: Macroevolution (as suggested by the General Theory of Evolution—as opposed to microevolution, as suggested by the Special Theory of Evolution) is not a fact, and as such, does not represent a correct scientific explanation of the origin of the Universe and life on Earth.

Having completed my assignment, I now leave you, the reader, to determine for yourself whether or not I have successfully accomplished my task. But speaking for myself, it seems plainly obvious that when evolution's proponents openly admit that they have nothing even close to an adequate explanation for such critically important parts of their theory as the naturalistic origin of life (without which evolution, by definition, would be impossible), the naturalistic origin of gender and sexual reproduction, the origin of language, or the origin of "the greatest miracle" of all (consciousness), I honestly do not see how any unbiased individual could come to the conclusion that organic evolution is "a scientific fact."

As evolutionist Sir John Eccles lamented in regard to the many failed attempts to explain the origin of consciousness, "Clearly, we are in deep trouble" (Eccles and Robinson, 1984, p. 17). I suggest—considering the well-documented additional material presented here regarding similar difficulties in numerous other areas of evolutionary thought—that such an assessment could be made across the board for organic evolution as a whole. Charles Darwin stated in the latter part of his *Origin of Species* that "long before the reader has arrived at this part of my work, a crowd of difficulties will have occurred to him. Some of them are so serious that to this day I can hardly reflect on them without being in some degree staggered" (1859, p. 158). Not much has changed in 150 years, has it?

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