CHRISTIAN THEOLOGY

BOOK IV

The Doctrine of Creation

Notes Compiled
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Table of Contents

Book IV

■ George Gallup stays with it, polling the religion pulse of the nation. The 1997 report is that 96 percent of the people say they believe in God (95 percent in 1996) and, as has been the case through the 1990s, nearly 60 percent say religion is "very important" in their lives. From which one may infer that at least 35 percent do not know what it means to believe in God. An alternative explanation is that they are theologically sophisticated and know that the sovereignty of God is in no way limited to the dimension of life called "religion." If you believe that, I have a bridge in which you might be interested. Those who say religion is very important: 65 percent of women, 47 percent of men; 81 percent of blacks, 64 percent of Hispanics, 54 percent of whites; 48 percent with post-graduate education, 61 percent with no college; 79 percent who call themselves very conservative, 43 percent of the very liberal; 64 percent of Protestants, 53 percent of Catholics, 23 percent of Jews; 71 percent of church members, 30 percent of those who are not members. In addition, 30 percent of adults believe "The Bible is the actual word of God and is to be taken literally, word for word." Fifty percent believe "The Bible is the inspired word of God, but not everything in it should be taken literally, word for word." Seventeen percent agree with the statement, "The Bible is an ancient book of fables, legends, history, and moral precepts recorded by men." (The poll did not ask how many—among the *really* liberal—thought the Bible was made up also by women.)

"Creation"

In the Beginning

According to a new Gallup Poll, the percentage of Americans who believe:

- **Strict Creationist View**
  God created man pretty much in his present form at one time within the last 10,000 years.

All Americans	47%
Men	39%
Women	53%
College graduates	25%
No high-school diploma	65%
Income above $50,000	29%
Income below $20,000	59%
Whites	46%
Blacks	53%

- **Centrist View**
  Man has developed over millions of years from less advanced forms of life, but God guided this process, including man's creation.

All Americans	40%
Men	45%
Women	36%
College graduates	54%
No high-school diploma	23%
Income above $50,000	50%
Income below $20,000	28%
Whites	40%
Blacks	41%

- **Naturalist View**
  Man has developed over millions of years from less advanced forms of life. God had no part in this process.

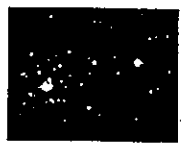
All Americans	9%
Men	11.5%
Women	6.6%
College graduates	16.5%
No high-school diploma	4.6%
Income above $50,000	17%
Income below $20,000	6.5%
Whites	9%
Blacks	4%

The Gallup Organization's poll was conducted November 21-24, 1991.

Note: The numbers do not total 100% because some respondents answered "I don't know."

"Darwin made it possible to be an intellectually fulfilled atheist."
Richard Dawkins

SCIENTISTS & THEIR GODS • PAUL DAVIES



My feelings about God and the universe have come about entirely through my science. I hesitate to use the word "God," but in my studies of the universe I have come to the conclusion that there is some purpose to it. The universe has organized itself in such a way as to become aware of itself. As conscious beings, we are part of that purpose.

Davies is a theoretical physicist and author of "The Mind of God."

SCIENTISTS & THEIR GODS • STEPHEN HAWKING

If we do discover a complete theory (of everything) . . . we shall all, philosophers, scientists and just ordinary people, be able to take part in the discussion of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason . . . for then we would truly know the mind of God.

From "A Brief History of Time." Hawking is a theoretical physicist and the Lucasian professor of mathematics at Cambridge University in England.

SCIENTISTS & THEIR GODS • CARL SAGAN

The idea that God is an oversized white male with a flowing beard who sits in the sky and tallies the fall of every sparrow is ludicrous. But if by "God" one means the set of physical laws that govern the universe, then clearly there is such a God. This God is emotionally unsatisfying . . . it does not make much sense to pray to the law of gravity.

Sagan is an astronomer and director of Cornell's Lab for Planetary Studies

SCIENTISTS & THEIR GODS • CHARLES DARWIN

I look at everything as resulting from designed laws, with the details left to the working out of what we may call chance. Not that this notion at all satisfies me. I feel most deeply that the whole subject is too profound for the human intellect.

SCIENTISTS & THEIR GODS • HENRY F. SCHAEFER

The significance and joy in my science comes in those occasional moments of discovering something new and saying to myself, "So that's how God did it." My goal is to understand a little corner of God's plan.

Schaefer is a quantum chemist and five-time nominee for the Nobel Prize.

"Modern science directly implies that the world is organized strictly in accordance with mechanistic principles. There are no purposive principles whatsoever in nature. There are no gods and no designing forces that are rationally detectable...."
William Provine, Cornell University

"Some of Darwin's important new concepts...are not only scientific theories but are at the same time important philosophical concepts, and characterize worldviews that have incorporated these concepts."
Ernst Mayer, Harvard University

"The most influential intellectuals in America and around the world are mostly naturalists, *who assume that God exists only as an idea in the minds of religious believers. In our great research universities, naturalism—the doctrine that nature is 'all there is'—is the virtually unquestioned assumption that underlies not only natural science but intellectual work of all kinds. If naturalism is true, then humankind created God—not the other way around."*
Phillip E. Johnson

"Humans are not the end result of predictable evolutionary progress, but rather a fortuitous cosmic afterthought...."
Stephen Jay Gould

"The reluctance of science to embrace the conclusion of intelligent design that its long, hard labors have made manifest has no justifiable foundation. Scientific chauvinism is an understandable emotion, but it should not be allowed to affect serious intellectual issues."
Michael Behe, Lehigh University

"In the beginning was the Word, and the Word was with God, and the Word was God. He was in the beginning with God. All things came into being through Him, and apart from Him nothing has come into being that has come into being."
John 1: 1-3

FIVE MAJOR VIEWS OF CREATION
(An Overview)

Atheistic Evolution

I. STATEMENT OF THE VIEW

Everything in the universe has come into existence and has evolved into its present form as a result of natural processes unaided by any supernatural power.

II. POSITIVE ASPECTS OF THE VIEW FROM ITS ADVOCATES

A. It appears to explain the origin of everything.

B. It offers a single explanation for everything that exists: it evolved.

C. It offers the only real alternative to creation by God.

D. It eliminates God and exalts man. It is thoroughly humanistic, and can be classified pantheistically if one wishes to invoke a form of theism.

III. PROBLEMS WITH THE VIEW AND ANSWERS BY ITS ADVOCATES

It cannot explain the origin of matter.	Matter is eternal
It cannot explain the complexity of matter.	Matter is the product of billions of years of evolution.
It cannot explain the emergence of life.	Primordial life evolved (via natural selection) from bio-polymers which evolved from bio-organics which evolved from inorganic compounds.
It cannot explain the appearance of God-consciousness and rationality in man.	This too was the product of evolution. In essence rationality emerged from irrationality.

IV. EVALUATION OF THE VIEW

A. It rests on a hypothesis that cannot be proved to be true; it is essentially a faith position (just like creationist positions).

B. It is supported by little historical (geological) evidence (only the fossil record) which has many gaps in it and is open to subjective interpretation.

C. It relies on mutations as a mechanism for change, but mutations have not produced new species, and are almost always harmful and destructive.

D. It is extremely improbable statistically.

E. It repudiates special revelation concerning creation.

V. MODERN ADVOCATES OF THE VIEW

Almost all non-Christian scientists.

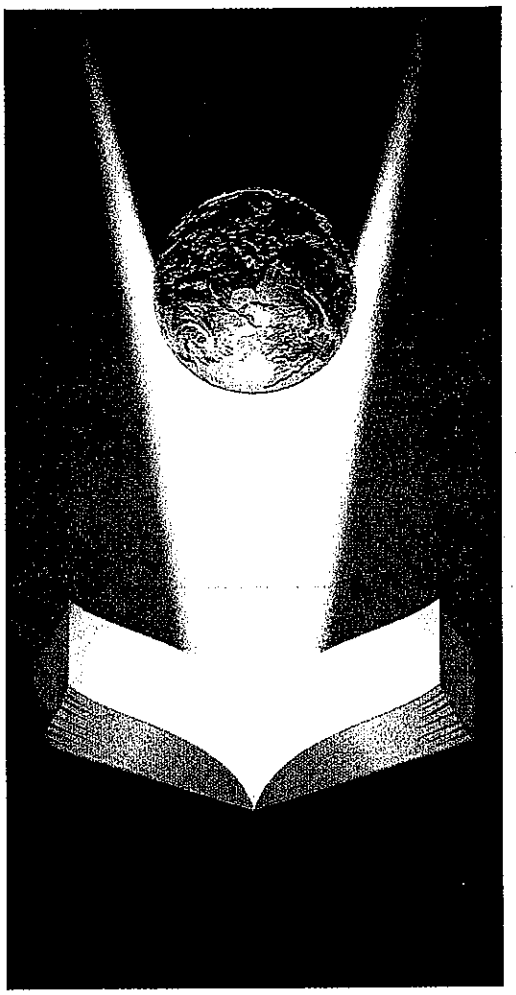
1C

The Genesis of the problem

The church can debate the question of creation without creating new divisions

THE QUESTION OF THE ANTIQUITY OF MAN HAS of itself no theological significance. It is to theology, as such, a matter of entire indifference how long man has existed on the earth.... The question of the antiquity of man is accordingly a purely scientific one in which the theologian as such has no concern."

Who said that? The latest evangelical to capitulate to the pressures of unbelieving science? No, it was the greatest defender of biblical inerrancy in the history of the American church, Princeton theologian B. B. Warfield, who also wrote: "The church is bound to confess all that God has lovingly revealed to her as his truth. What the Bible teaches, not what is convenient, undisputed, or likely to put us to the trouble of defending, is the proper measure of the contents of our credo."



At least since the days of Augustine the church has wrestled with how to interpret Genesis 1 and 2. To be sure, the question has become more acute and the debate more intense since Darwin, as is evident in the writings not only of Warfield but of his fellow Princetonians Charles Hodge, A. A. Hodge, and J. Gresham Machen. But the difficulty has faced the church always.

THERE ARE THREE APPROACHES to Genesis 1 and 2 among evangelicals:

The "literal" view, which takes the days to be six consecutive 24-hour days. Suppose you took a seven-day vacation and reported it in a book of seven chapters, each devoted to a single day. Your report makes it clear that your vacation lasted exactly seven ordinary days and that, while you may not have reported every detail, you did follow a strictly chronological sequence both from day to day and within each day. This is the "literal" approach.

Its strength is its reading of the creation account in a way that strikes many Christians as the natural way to read it—as a straightforward historical account of how the world was created.

The "day-age" view, which takes the days to be equivalent to successive ages of undetermined length. Suppose you took a long vacation reported in a book of seven chapters, each devoted to a phase of your vacation. Your concern is to report your vacation in an orderly fashion.

Thus, the chapters are in roughly chronological order, but the chapters do not necessarily record periods of equal length. Nor can any more be said of the material in each chapter than that it belongs to the period reported. This is the "day-age" approach.

The strength of this view is that it records creation as a chronologically ordered account while allowing for the earth to be as old as it appears to be to most scientists.

The "literary" view or "framework hypothesis," which takes the days to be "snapshots" of God's multi-faceted creative work. Suppose you took a long vacation and reported it in seven chapters. Your theme is "a good time was had by all" but the chapters are organized around beach experiences, mountain experiences, amusement park experiences. So the "literary" approach reads Genesis as a polemic against polytheistic paganism organized around the theme "the Lord God made them all" but unconcerned about sequence or chronology.

The strength of this view is that it reads these two chapters of Genesis in a way that to many Hebrew scholars as well as ordinary readers seems to fit Moses' purpose and style and removes Genesis from certain aspects of the alleged "Bible-science conflict" as not having been written to settle those questions.

THE POINT OF THIS BRIEF review of the views is to say that all are held by theologians and Christians who believe that the Bible is the Word of God, infallible and inerrant in all it teaches. We need an ongoing, open discussion of three questions: What does the text teach? What does science seem to show? How are theological and scientific insights to be integrated? My theology professor of 25 years ago has written regarding the days of the creation: "Though we may have strong convictions regarding this question ... we do not have enough information to settle it definitively. We should refrain from judging fellow Christians who differ with us on this particular question."

What we need, to turn the words of a country song, is "a lot more talk and a little less action." More discussion, less defensiveness. More debate, less denouncement.

by WILLIAM H. SMITH

Theistic Evolution

I. STATEMENT OF THE VIEW

Everything in the universe has come into existence and has evolved into its present form as a result of natural processes guided by the God of the Bible.

II. POSITIVE ASPECTS OF THE VIEW FROM ITS ADVOCATES

A. It unites truth known by special revelation in the Bible with truth known by general revelation in nature and discovered by science.

B. God seems to work according to this pattern in history interrupting and intervening in the course of events only rarely.

III. PROBLEMS WITH THE VIEW AND ANSWERS BY ITS ADVOCATES

It presupposes the truth of evolution which has not been validated.	Evolution is a fact, or at least a strongly accepted theory.
God has intervened in history many more times than the theistic evolutionist posits.	In the early history of the universe He intervened less frequently.
Divine intervention in the evolutionary process is contradictory to the basic theory of evolutionary process.	The evolutionary process does not rule out divine intervention.
This method of creation does not do justice to the biblical record of creation.	The biblical record must be interpreted more freely.

IV. EVALUATION OF THE VIEW

A. It cannot do justice to both the tenets of evolution and the teaching of Scripture. One must be given precedent over the other.

B. It is ultimately destructive of biblical religion (at least this has been the case historically).

V. MODERN ADVOCATES OF THE VIEW

Pierre, Teilhard de Chardin, The Phenomenon of Man (New York: Harper and Row, 1959). (He is a French Roman Catholic priest.)

Some scientists and numerous theologians who have respect for but a deficient view of Scripture hold this view.

Progressive Creation

(also known as the Day-Age Theory)

I. STATEMENT OF THE VIEW

God created the world directly and deliberately, without leaving anything to chance, but He did it over long periods of time that correspond roughly to the geological ages.

II. POSITIVE ASPECTS OF THE VIEW FROM THE PERSPECTIVE OF THOSE WHO HOLD IT

A. It provides a reasonable harmony between the Genesis record and the facts of science.

B. The translation of "day" as "age" though rare, is an exegetically legitimate one.

C. It is a tentative conclusion and acknowledges that not all the scientific evidence is in and our understanding of the text may change as biblical (and scientific) scholarship progresses.

III. PROBLEMS WITH THE VIEW AND ANSWERS BY ITS ADVOCATES

There are discrepancies between the fossil record and the order in which plants, fish, and animals are said to have been created in Genesis.	Science may be wrong at this point, or the earliest forms of life may be omitted in Genesis.
Taking the six days of creation as ages is unusual exegetically.	But it is possible and best here.
"Evenings" and "mornings" suggest 24-hour periods.	But the sun did not appear until the fourth day.
Death enters the world before the Fall.	It took on its horror at the Fall but existed before that event.

IV. EVALUATION OF THE VIEW

This view takes the biblical text quite seriously but adopts some unusual interpretations in order to harmonize with scientific data.

V. MODERN ADVOCATES OF THE VIEW

Davis, A. Young, Creation and the Flood (Grand Rapids: Baker Book House, 1977).

Many evangelicals who have been strongly influenced by science including James Boice, Bernard Ramm, Robert Newman, and Herman Eckelmann, hold this view.

Six-Day Creationism

I. STATEMENT OF THE VIEW

Genesis 1 describes one creative process that took place in six consecutive 24-hour periods of time not more than 6-20 thousand years ago (many would allow for an older earth and creation date).

II. POSITIVE ASPECTS OF THE VIEW FROM THE PERSPECTIVE OF THOSE WHO HOLD IT

A. It regards biblical teaching as determinative.

B. It rests on a strong exegetical base.

C. It is the clearest meaning of the text.

D. It is consistent with the laws of thermo-dynamics.

1. 1ST LAW OF THERMODYNAMICS: although energy can be changed in form, it is not now being created. Genesis 2:1-3; Hebrews 4:4,10

2. 2ND LAW OF THERMODYNAMICS: all physical systems, if left to themselves, tend toward atrophy and become disordered. Hebrews 1:10-12; Romans 8:20-22

III. PROBLEMS WITH THE VIEW AND ANSWERS BY ITS ADVOCATES

Data from various scientific disciplines (astronomy, radioactive dating, carbonate deposits, etc.) indicates the earth is about 5 billion years old and the universe is about 15-20 billion years old.	God created the cosmos with the appearance of age and much of scientific opinion is in error and also now in flux and change.
A universal flood cannot explain the geologic strata fully.	It can. The problem is most scientists refuse to even consider it due to biblical bias.
Creation with the appearance of age casts doubt on the credibility of God.	Since Adam was evidently created with the appearance of age, other things could have been too. This is self-evident in the text.
There is no reason why God would have created things with the appearance of age.	It is consistent with his creating a fully operational and mature universe.

IV. EVALUATION OF THE VIEW

This view is based on the best exegesis of the text though it contradicts the present conclusions of several branches of science.

V. MODERN ADVOCATES OF THE VIEW

Robert E. Kofahl and Kelly L. Seagraves, The Creation Explanation (Wheaton, IL: Harold Shaw Publishers, 1975).

Creation Research Society (Morris, Gish, etc.)

Many conservative evangelicals.

The Gap Theory

I. STATEMENT OF THE VIEW

Between Gen. 1:1 and 2 there was a long, indeterminate period in which the destruction of an original world and the unfolding of the geological ages can be located. God then recreated our cosmos.

II. POSITIVE ASPECTS OF THE VIEW FROM THE PERSPECTIVE OF THOSE WHO HOLD IT

A. It rests on an exegetical, biblical base.

B. It is consistent with the structure of the creation account itself.

C. It is possible to translate the Hebrew verb "to be," in verse 2, "become."

D. "Formless and void," in verse 2, may be a clue to a preadamic judgment of God on the earth (cf. Isa 45).

E. It provides a setting for the fall of Satan.

III. PROBLEMS WITH THE VIEW AND ANSWERS BY ITS ADVOCATES

It is an unnatural explanation since the text implies an original creation in Gen 1:2ff. (cf. Exod 20:11)	This interpretation is a superficial conclusion.
The exegetical data that supports this view is far from certain and highly unlikely.	These interpretations are possible.

This theory does not really settle the problems posed by geology.	The universal flood may have produced some of the geological phenomena.

IV. EVALUATION OF THE VIEW

While the view builds on a high view of Scripture, several of the interpretations required for it are based on improbable exegesis. In this light some have proposed moving the gap to between John 1:1 and Gen 1:1.

V. MODERN ADVOCATES OF THE VIEW

Arthur C. Constance, Without Form and Void (Brockville, Ont: Doorway Papers, 1970).

Many conservative evangelicals including W.A. Criswell, Arthur Pink, C. I. Scofield, C. S. Lewis, M. R. DeHaan, and D. G. Barnhouse hold this view.

A condensation of James M. Boice, Genesis, Vol. 1, Ministry Resources Library series (Grand Rapids: Zondervan Publishing House, 1982), pp. 37-68, with additions by Thomas L. Constable, 1987 and Daniel L. Akin, 1993.

"THE ISSUES AT STAKE"

EVOLUTIONISTS SAY	THE BIBLE SAYS
1. THE WORLD IS GETTING BETTER AND BETTER	**1. SIN HAS CREATION IN A DOWNWARD SPIRAL. GENESIS 2:8,9; 3:17-19**
2. LIFE WAS CREATED FROM NON-LIFE	**2. GOD CREATED ALL THINGS. GENESIS 1:27; 2:7**
3. THERE HAS ALWAYS BEEN A UNIFORM GEOLOGY	**3. GOD HAS CATACLYSMICALLY INTERVENED PERIODICALLY. GENESIS 7:10-12, 21-24**
4. MAN IS AN ANIMAL WITH NO HOPE FOR THE FUTURE	**4. MAN BEARS GOD'S IMAGE AND THOUGH FALLEN HE IS REDEEMABLE IN CHRIST JESUS. EPHESIANS 2:1-10**

* *The age of the Earth/universe is not the best place or even a necessary place to wage the war of evolution/creation. Leave it open.*

* *A historical Adam & Eve is a must and not negotiable. The issue is both Christological and soteriological.*

* *Evolution is in trouble. The theory continually changes form. It is my judgement that early in the next millennium it will cease to be viable, at least in its present models.*

6

Oxford University's Richard Dawkins Preaches Evolution to a Skeptical Public

"We don't need evidence. We know it to be true." —*RICHARD DAWKINS, professor of zoology at Oxford University, in a speech at Washington University in St. Louis. Mr. Dawkins was explaining his intellectual commitment to Darwinian evolution as the explanation of human origins.*

BY KIM A. MCDONALD

WASHINGTON

RICHARD DAWKINS is sitting in a hotel bathroom here fielding questions about evolution, religion, and the nature of life.

It's not the most dignified place for an interview with the distinguished, silver-haired professor from Britain's Oxford University. Yet Dr. Dawkins doesn't seem to mind the setting, dutifully following the instructions of a make-up artist who selected the spot to prepare him for his next on-camera appearance of the afternoon.

The rushed interview, which is made more difficult by frequent interruptions from the television crew that bangs and clatters around him, would easily rattle the nerves of any academic uneasy about communicating his scholarly ideas to the public. But Britain's best-known promoter of Darwinian evolution is anything but that. A controversial lecturer, best-selling author, and leading evolutionary theorist, Dr. Dawkins is clearly at home in the glare of television lights, on radio talk shows, and in book-tour interviews.

MAKING AN IMPACT

"Do I miss doing laboratory research?" he says, craning his neck around the make-up artist. "A bit, but I can probably make more of an impact by going out and writing books, doing radio broadcasts, and writing articles in newspapers. If I could guarantee that from my lab work I would be another Francis Crick, it would be another matter. But given that I would end up being another Joe Blow, I might as well do what I do best."

What Dr. Dawkins does best is to communicate the message of Darwinian evolution to a citizenry that is increasingly less informed about science and, at least in this country, increasingly more receptive to the teachings of fundamentalist Christians.

That mission makes his appointment last year to an endowed professorship in the public understanding of science—the first such position at Oxford—particularly apt.

"There are actually two professors of public understanding of science in Britain," he says. "One in London, who interprets his position as doing academic research on the public understanding of science. I interpret it as promoting the public understanding of science. That's actually what I've done for a long time, but now I'm doing it full time instead of half time."

Some question whether the media-savvy professor—a youthful-looking 55-year-old who creates a striking portrait when he enters the room with his wife, Lalla Ward, an actress who played Ophelia in a BBC production of *Hamlet*—is the most appropriate ambassador for science. He has drawn the wrath of theologians for calling religion a virus, because of the way he says it infects people's minds, replicates, and spreads. He criticizes scientists who profess their belief in God, once said astrologers should be jailed, and proudly proclaims his atheism as the only rational choice for a person governed by intellect.

"Darwin allows one to be an intellectually fulfilled atheist," he explains. "Before we had Darwin, the argument from design might have looked superficially like a good argument. You could have been an atheist, but you would have had to worry about how did it all come about. After Darwin, everything fell into place and one really felt a deep peace of mind, a deep satisfaction, a deep comfort with the idea that there was nothing else prior—that all of this incredible diversity is all explainable in terms of gradual change."

Despite the irreverent, sometimes self-righteous way with which he spreads his Darwinian gospel, Dr. Dawkins communicates his provocative ideas with a clarity and eloquence that few scientists possess. Such qualities make him a highly prized interviewee for the now popular subject of God's place in this age of science.

Today, he is in Washington on a worldwide tour promoting his latest book, *Climbing Mount Improbable*, a continuation of his 1986 work, *The Blind Watchmaker*, both published by W. W. Norton. In each of those works, he demonstrates how the forces of natural selection can fashion organisms and structures, such as the human eye or a spider's web, that are so intricately designed they were once used by 19th-century theologians as proof of the existence of God.

In spite of his eagerness to talk about those examples, this afternoon's television interviews—for a Public Broadcasting Service series called "Faith and Reason" that will air next year and for another PBS show, "Think Tank With Ben Wattenberg"—do not focus on his book or his views on the intricacies of natural selection. What the interviewers want to know is what most people keep asking him these days: If evolution is a sound theory, why can't God exist?

NOT INTERESTED IN GOD

He has grown exasperated by the question. "If you read my books, you'll find that I don't actually talk about God at all," he tells Mr. Wattenberg. "The reason I seem to always talk about God, if I may say so, is that people like you are always asking me about it. I'm not very interested in God. I mean, from my perspective, why God? Why not Thor or Zeus? Why not Apollo or Athena? There are all sorts of gods that people have believed in, and I don't think any of them are much more interesting than any other."

Last month, Pope John Paul II sought to bridge the gulf between Christian belief and Darwin by saying that evolution and faith can co-exist so long as scientists accept the idea that evolution was the work of God. Dr. Dawkins is one scientist who clearly won't.

"There's a new way of trying to reinstate God," he says indignantly. "We can see that evolution is true, and anyone but a fool can see that it is true, so we've smuggled God back in by saying that he set up the conditions under which evolution might take place. I find this a rather pathetic argument. For one thing, if I were God and I wanted to make a human being, why deliberately set it up in the one way in which it looks as if you don't exist? The other point is it's a superfluous part of the explanation.

"The whole beauty of the Darwinian explanation is that you start with something very, very simple and from that you build up to more complicated entities like ourselves. We have a good explanation. Why smuggle in a superfluous adjunct, which is unnecessary and doesn't add anything to the explanation?"

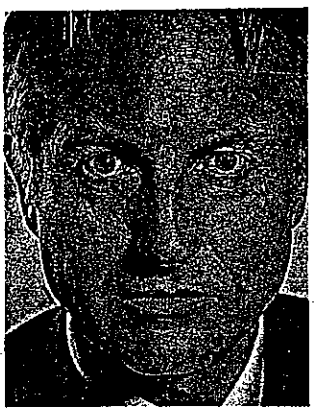
Dr. Dawkins may tolerate religious speculation from journalists, but he has little patience for the handful of scientists who maintain that evolution is incapable of explaining everything that exists in the living world. Much of his scorn lately has been reserved for Michael J. Behe, a biochemist at Lehigh University who contends in his new book, *Darwin's Black Box: The Biochemical Challenge to Evolution* (The Free Press), that God's handiwork can be seen in the "irreducibly complex" parts of organisms that could not have evolved from simpler components (*The Chronicle*, November 1).

To Dr. Dawkins, Dr. Behe's thesis is nothing more than the 19th-century theologians' argument from design, from a scientist who should know better. Dr. Behe, for example, asserts in his book that because he cannot understand how the flagellum of bacteria could have evolved, it must be the work of God. But Dr. Dawkins is aghast that any scientist in this day and age could reach such a conclusion. "It's a pathetic cop-out of his responsibilities as a scientist," he snaps. "He should stop being lazy and get up and think about it himself."

Dr. Behe has some problems of his own with the Oxford professor. "Dawkins's problem is that he is trying to popularize nonexistent science," he writes in the October 14 issue of *National Review*. "Real science is published in journals such as the *Proceedings of the National Academy of Sciences*, the *Journal of Molecular Biology*, and so forth (virtually none of it written by Dawkins, who writes only for lay audiences)."

Creation scientists aren't Dr. Dawkins's only scientific targets. He has some stern words for scientists who invoke God to describe the magnificence of the universe.

"There are physicists who are deeply awed as I am by the majesty of the universe and the origin of the laws of physics," he says. "They say God is in the equation. God is in the fundamental constant. That is just a redefinition of that which we find mysterious about the universe. But other people will say, 'Well, if this great physicist believes in God, therefore I'm free to believe in the Trinity, the Crucifixion, and all that stuff which has nothing to do with the fundamental constants of physics.' It's given rise to considerable misunderstanding, which I think they have a responsibility to clear up."



STEVE DOUBLE, RETNA PICTURES

Oxford University's Richard Dawkins, Britain's most prominent defender of evolution: "Darwin allows one to be an intellectually fulfilled atheist."

Listening to Dr. Dawkins defend Darwin's 19th-century ideas against religious doctrine, it's easy to forget that he is a revolutionary thinker himself, one who has made important contributions to evolutionary theory over the past two decades.

His first book, *The Selfish Gene* (Oxford, 1976), for example, extended the ideas of Darwin, Dr. Dawkins's Oxford colleague W. D. Hamilton, and the Harvard University biologist Edward O. Wilson to suggest that genes, rather than individual organisms, are the primary elements on which natural selection operates.

'SURVIVAL MACHINES'

That view of evolution, which was embraced by the sociobiology movement of the 1970s, saw organisms as the conduits for the selfish interests of their genes, the most important of which is to reproduce and be successful enough to survive within the next generation. "We are survival machines," he wrote, "robot vehicles blindly programmed to preserve the selfish molecules known as genes."

That notion was criticized by some evolutionary biologists as an extremist and a ridiculously reductionist view of natural selection. While he continues to maintain that "all living organisms are machines for the propagation of the instructions of their genes," he now acknowledges that the human brain is so complicated that we can override much of the deterministic behavior imprinted in our genes.

In fact, he contends, "we have deliberately taken the position to emancipate ourselves from the world of natural selection and make a new world for ourselves, which is an anti-Darwinian world." For example, we use contraceptives to prevent the outcome of our sexual desires.

Dr. Dawkins hasn't restricted his Darwinian thinking to biology; he has extended it to human culture as well. He is perhaps best known for introducing the concept of *memes*—powerful ideas that, like genes or viruses, infect our minds, reproduce, and evolve as if shaped by the same laws of natural selection in human society.

Religion is a *meme*. So are fashion trends. According to Dr. Dawkins, human society is shaped by the evolution of *memes* as well as genes. The idea, which is itself a *meme*, has caught on. Some scholars are using the concept to describe life as an information process, in which *memes* as well as genetic information follow evolutionary principles. A discussion group on the Internet, "alt.memetics," focuses on the latest applications of the idea.

Not all *memes* are alike, though. After characterizing religion as a "virus of the mind," Dr. Dawkins has been asked by those upset by the derogatory designation why he won't apply it to science or evolutionary theory. His reply is that, unlike the exact replication of religious ideas, scientific theories are constantly modified. "Some die, some live," he says. "They survive the test of experiment." Religious doctrines, on the other hand, he says, are more like a "chain letter" that people are forced to pass on to others under the threat of eternal damnation.

But religion and evolution may not be as disparate as Dr. Dawkins professes. After a recent medical study showed that people of faith tend to live longer than atheists, Darwin's most prominent modern disciple has been forced to consider the possibility that the human tendency to believe in a superior being may, in a Darwinian sense, have a survival value.

While he acknowledges that such a trait could have evolved, Dr. Dawkins maintains he could never blindly embrace religion, even if it improved his own Darwinian fitness. "It depends on whether you value health or truth," he says. "For myself, I would rather live a little bit less long and know the truth about why I lived, than to live longer." ■

SUMMARY OF SCIENTIFIC EVIDENCE FOR CREATION

"The creation model is at least as scientific as the evolution model, and is at least as nonreligious as the evolution model."

"This scientific evidence both for creation and for evolution can and must be taught without any religious doctrine, whether the Bible or the Humanist Manifesto" (in the public schools).

"Creation-science proponents want public schools to teach all the scientific data, censoring none, but do not want any religious doctrine to be brought into science classrooms."

DEFINITIONS OF THE CREATION MODEL AND THE EVOLUTION MODEL

The scientific *model of creation*, in summary, includes the scientific evidence for a sudden creation of complex and diversified kinds of life, with systematic gaps persisting between different kinds and with genetic variation occurring within each kind since that time. The scientific *model of evolution*, in summary, includes the scientific evidence for a gradual emergence of present life kinds over aeons of time, with emergence of complex and diversified kinds of life from simpler kinds and ultimately from nonliving matter. The creation model questions vertical evolution, which is the emergence of complex from simple and change between kinds, but it does not challenge what is often called horizontal evolution or microevolution, which creationists call genetic variation or species or subspecies formation within created kinds. The following chart lists seven aspects of the scientific model of creation and of the scientific model of evolution:

	The creation model includes the scientific evidence and the related inference suggesting that:		**The evolution model includes the scientific evidence and the related inference suggesting that:**
I.	The universe and the solar system were suddenly created.	I.	The universe and the solar system emerged by naturalistic processes.
II.	Life was suddenly created.	II.	Life emerged from nonlife by naturalistic processes.
III.	All present living kinds of animals and plants have remained fixed since creation, other than extinctions, and genetic variation in originally created kinds has only occurred within narrow limits.	III.	All present kinds emerged from simpler earlier kinds, so that single celled organisms evolved into invertebrates, then vertebrates, then amphibians, then reptiles, then mammals, then primates, including man.
IV.	Mutation and natural selection are insufficient to have brought about any emergence of present living kinds from a simple primordial organism.	IV.	Mutation and natural selection have brought about the emergence of present complex kinds from a simple primordial organism.
V.	Man and apes have a separate ancestry.	V.	Man and apes emerged from a common ancestor.
VI.	The earth's geologic features appear to have been fashioned largely by rapid, catastrophic processes that affected the earth on a global and regional scale (catastrophism).	VI.	The earth's geologic features were fashioned largely by slow, gradual processes, with infrequent catastrophic events restricted to a local scale (uniformitarianism).
VII.	The inception of the earth and of living kinds may have been relatively recent.	VII.	The inception of the earth and then of life must have occurred several billion years ago.

I. THE UNIVERSE AND THE SOLAR SYSTEM WERE SUDDENLY CREATED.

The First Law of Thermodynamics states that the total quantity of matter and energy in the universe is constant. The Second Law of Thermodynamics states that matter and energy always tend to change from complex and ordered states to disordered states. Therefore the universe could not have created itself, and it could not have existed forever, or it would have run down long ago. Thus the universe, including matter and energy, apparently must have been created.

The "big-bang" theory of the origin of the universe contradicts much physical evidence and seemingly can only be accepted by faith.

The universe has "obvious manifestations of an ordered, structured plan or design."

II. LIFE WAS SUDDENLY CREATED

Life appears abruptly and in complex forms in the fossil record, and gaps appear systematically in the fossil record between various living kinds. These facts indicate that basic kinds of plants and animals were created.

The Second Law of Thermodynamics states that things tend to go from order to disorder (entropy tends to increase) unless added energy is directed by a conversion mechanism (such as photosynthesis), whether a system is open or closed. Thus simple molecules and complex protein, DNA, and RNA molecules seemingly could not have evolved spontaneously and naturalistically into a living cell; such cells apparently were created.

"One example of the scientific evidence for creation is the sudden appearance of complex fossilized life in the fossil record, and the systematic gaps between fossilized kinds in that record. The most rational inference from this evidence seemingly is that life was created and did not evolve."

III. ALL PRESENT LIVING KINDS OF ANIMALS AND PLANTS HAVE REMAINED FIXED SINCE CREATION, OTHER THAN EXTINCTIONS, AND GENETIC VARIATION IN ORIGINALLY CREATED KINDS HAS ONLY OCCURRED WITHIN NARROW LIMITS.

Systematic gaps occur between kinds in the fossil record. None of the intermediate fossils that would be expected on the basis of the evolution model have been found between single-celled organisms and invertebrates, between invertebrates and vertebrates, between fish and amphibians, between amphibians and reptiles, between reptiles and birds or mammals, or between "lower" mammals and primates. While evolutionists might assume that these intermediate forms existed at one time, none of the hundreds of millions of fossils found so far provide the missing links. The few suggested links such as *Archaeopteryx* and the horse series have been rendered questionable by more detailed data. Thus present kinds of animals and plants apparently were created, as shown by the systematic fossil gaps and by the similarity of fossil forms to living forms.

IV. MUTATION AND NATURAL SELECTION ARE INSUFFICIENT TO HAVE BROUGHT ABOUT ANY EMERGENCE OF PRESENT LIVING KINDS FROM A SIMPLE PRIMORDIAL ORGANISM.

The mathematical probability that random mutation and natural selection ultimately produced complex living kinds from a simpler kind is infinitesimally small even after many billions of years. Thus mutation and natural selection apparently could not have brought about evolution of present living kinds from a simple first organism.

Mutations are always harmful or at least nearly always harmful in an organism's natural environment.

Natural selection is a tautologous concept (circular reasoning) because it simply requires the fittest organisms to leave the most offspring and at the same time it identifies the fittest organisms as those that leave the most offspring.

V. MAN AND APES HAVE A SEPARATE ANCESTRY.

Although highly imaginative "transitional forms" between man and ape-like creatures have been constructed by evolutionists based on very fragmentary evidence, the fossil record actually documents the separate origin of primates in general, monkeys, apes, and men. In fact, Lord Zuckerman (not a creationist) states that there are no "fossil traces" of a transformation from an ape-like creature to man.

The fossils of Neanderthal Man were once considered to represent a primitive sub-human (*Homo neanderthalensis*), but these "primitive" features are now known to have resulted from nutritional deficiencies and pathological conditions; he is now classified as fully human. *Ramapithecus* was once considered to be partially man-like, but is now known to be fully ape-like. *Australopithecus,* in the view of some leading evolutionists, was not intermediate between ape and man and did not walk upright.

The strong bias of many evolutionists in seeking a link between apes and man is shown by the near-universal acceptance of two "missing links" that were later proved to be a fraud in the case of Piltdown Man (*Eoanthropus)* and a pig's tooth in the case of Nebraska Man (*Hesperopithecus*).

VI. THE EARTH'S GEOLOGIC FEATURES WERE FASHIONED LARGELY BY RAPID, CATASTROPHIC PROCESSES THAT AFFECTED THE EARTH ON A GLOBAL AND REGIONAL SCALE (CATASTROPHISM).

Catastrophic events have characterized the earth's history. Huge floods, massive asteroid collisions, large volcanic eruptions, devastating landslides, and intense earthquakes have left their marks on the earth. Catastrophic events appear to explain the formation of mountain ranges, deposition of thick sequences of sedimentary rocks with fossils, initiation of the glacial age, and extinction of dinosaurs and other animals. Catastrophism (catastrophic changes), rather than uniformitarianism (gradual changes), appears to be the best interpretation of a major portion of the earth's geology.

Geologic data reflect catastrophic flooding.

Uniform processes such as normal river sedimentation, small volcanoes, slow erosion, and small earthquakes appear insufficient to explain large portions of the geologic record. Even the conventional uniformitarian geologists are beginning to yield to evidences of rapid and catastrophic processes.

VII. THE INCEPTION OF THE EARTH AND OF LIVING KINDS MAY HAVE BEEN RELATIVELY RECENT.

Radiometric dating methods (such as the uranium lead and potassium-argon methods depend on three assumptions: (a) that no decay product (lead or argon) was present initially or that the initial quantities can be accurately estimated, (b) that the decay system was closed through the years (so that radioactive material or product did not move in or out of the rock), and (c) that the decay rate was constant over time. Each of these assumptions may be questionable: (a) some nonradiogenic lead or argon was perhaps present initially; (b) the radioactive isotope (uranium or potassium isotopes) can perhaps migrate out of, and the decay product (lead or argon) can migrate into, many rocks over the years; and (c) the decay rate can perhaps change by neutrino bombardment and other causes. Numerous radiometric estimates have been hundreds of millions of years in excess of the true age. Thus ages estimated by the radiometric dating methods may very well be grossly in error.

Alternate dating methods suggest much younger ages for the earth and life. Estimating by the rate of addition of helium to the atmosphere from radioactive decay, the age of the earth appears to be about 10,000 years, even allowing for moderate helium escape. Based on the present rate of the earth's cooling, the time required for the earth to have reached its present thermal structure seems to be only several tens of millions of years, even assuming that the earth was initially molten. Extrapolating the observed rate of apparently exponential decay of the earth's magnetic field, the age of the earth or life seemingly could not exceed 20,000 years. Thus the inception of the earth and the inception of life may have been relatively recent when all the evidence is considered.

"There is scientific evidence for creation from cosmology, thermodynamics, paleontology, biology, mathematical probability, geology, and other sciences."

"There are many scientists in each field who conclude that the scientific data best support the creation model, not the evolution model."

Johann Kepler: Letting the Heavens Declare the Glory of God

About the time the Reformation was proclaiming Christ rather than the pope as the head of the Church, science was announcing that the sun, rather than the earth was the center of our planetary system. A leader in this changing scientific perspective was the German scientist Johann Kepler. Kepler (1571-1630) was the first scientist to accept Copernicus' theories that the earth rotated about the sun, and he was an important forerunner of Isaac Newton in systematizing science.

Kepler: "Since we astronomers are priests of the highest God in regard to the book of nature, it befits us to be thoughtful, not of the glory of our minds, but rather, above all else, of the glory of God."

A devout Lutheran, Kepler was studying theology and planning to become a minister when he was called to teach mathematics in Graz, Austria. Kepler realized he could glorify God through his mathematical and astronomical studies, and his scientific notes were often mixed with prayers and praise to his Lord.

Kepler believed that there was an art and orderliness in God's creation and that the more Christians recognized the greatness of creation, the deeper their worship would be. Didn't God himself encourage the heathen to look carefully at creation so that they might come to know God? God created man in His image, and He wants us to recognize and know His design for the universe: *The chief aim of all investigations of the external world should be to discover the rational order and harmony which has been imposed on it by God and which He revealed to us in the language of mathematics.* In his astronomical research, Kepler only wanted to, as he put it, "think God's thoughts after Him."

Kepler believed that there was a mathematical precision and orderliness in the universe; the scientist's duty was to discover what mathematical formula God had used. In Kepler's day, scientists believed the orbits of the planets were perfectly circular, but that theory did not fit the empirical data. Kepler persisted in his observation and calculations of the planetary movements until he could show that the planetary orbits were ellipses, with the sun as one of the epicenters. His calculations proved Copernicus' theory to be fact. Through further observation, Kepler established laws for planetary velocity and for the relationship between orbital periods and the distances of planets from the sun. Kepler's three laws for planetary motion are the basis for our understanding of the solar system today.

Throughout his scientific work, Kepler never sought any glory for himself, but always sought to bring glory to God. At the end of his life his prayer was: *I give you thanks, Creator and God, that you have given me this joy in thy creation, and I rejoice in the works of your hands. See I have now completed the work to which I was called. In it I have used all the talents you have lent to my spirit.*

Perspectives on Genesis One

	Recent Creationism	Progressive Creationsim Day-Age	Progressive Creationsim Intermittent Day	Mythological (Religious Only)	Gap Theory
Main Objective Genesis One	Cosmology Anthropology	Cosmology Anthropology	Cosmology Anthropology	Teaching Religious Truth	Regeneration Anthropology
God's Creative Activity	Fiat Only	Fiat and Natural Processes	Fiat Only	No Comment	Fiat Only
Six Days of Genesis One	Literal 24 hour, solar days	Indefinite Periods of Time (ages)	24 Hour Days Geologic Ages between each day	Literary Days Logical Order Not Chronological	24 Hour Days
Age of Earth	10,000 - 20,000 Years	Several Billion Years	Several Billion Years	No Comment	Several Billion Years
Origin of Life and Man	Fiat Creation	Most Fiat Creation. Some Evolution Directed by God	Fiat Only	No Comment	Fiat Creation Only
Evolution	Micro-Evolution only	Micro-Evolution only (except theistic evolution)	Micro-Evolution only	No Comment	Micro-Evolution Only
Origin of Current Land Forms	Noah's Flood	Current Geologic Processes	Current Geologic Processes	No Comment	Pre Gen.1:2 Creation & Noah's Flood
Origin of Rock Strata and Fossils	Upper part of Noah's Flood and Lower part of original creation	Progressive deposition through billion year history	Progressive deposition through billion year history	No Comment	Upper Part Noah's Flood; Lower part Destruction from Satan's fall.
Dinosaurs	Taken on Noah's Ark. Extinction after the flood	Extinction in Sixth Day (age) before Man's creation or Evolution	Extinction in Geologic Age before the 6th 24 hour day on which man was created	No Comment	Part of the original Creation which perished when Satan fell.

Basic Elements in The Creation Account

Thesis: God created the Universe ex nihilo

Chaos: Waste and void, darkness on the deep of the original creation material

Creation: Spirit of God hovering over the face of the water and creatively bringing order out of the disorganized material

Day 1: Light out of darkness, day and night separated
Day 2: Waters above and below separated: heaven
Day 3: Seas gathered and dry land appears: vegetation
Day 4: Heavenly luminaries formed to rule and divide times
Day 5: Marine life and birds created and blessed
Day 6: Animal life created and blessed; human life created, blessed and commissioned

Completion: Day 7: Creation marked with sanctified rest

Theological Themes in the Creation Account

Day	Activity	Theological Themes
1	Light created, light divided from darkness	Revelation of God's goodness and separation from evil
2	Heaven divided from waters below	Separation from evil abyss (deep)
3	Land appears and vegetation	Provision of fertile land for all types of vegetation
4	Luminaries designated to rule times and seasons	Designation of appointed times and seasons for ordering creation
5	Living creatures of the sea and air created and blessed	Provision and blessing of all kinds of animal life
6	Land animals created and blessed; human life created and blessed and commissioned to have dominion	Provision of human life (seed) and blessing of fertility and dominion over creation
7	Completion of creation and designation of the seventh day	Provision of sanctifying, or theocratic, rest

The Creative Work of God		
	Genesis 1(General creation)	Genesis 2 (Specific of man)
Creation Accounts	God the creator Elohim God as powerful Creation of the universe Climaxes with man The six days of creation	God the covenant-keeper Yahweh God as personal Creation of man Climaxes with marriage The sixth day of creation
Genesis 1:2	"without form..."	"...and void"
Six Days of Creation	In the first three days, God formed the Creation Day 1: light Day 2: water, atmosphere Day 3: earth, vegetation	In the second three days, God filled the Creation Day 4: sun, moon, stars Day 5: sea creatures, birds Day 6: animals

Cosmic Sleuth Finds No Clues About Creation - The Associated Press

Arlington, Va. - A satellite designed to detect patterns of cosmic creation has found nothing to explain how basic structures in the universe, such as galaxies and stars, came to exist, researchers said Saturday.

In a news conference announcing first results from the Cosmic Background Explorer satellite launched in November, scientists said instruments detected none of the patterns of microwave and infrared radiation that would help to explain how stars and galaxies started forming after the Big Bang explosion 15 billion years ago.

The scientists, presenting their findings in the final day of the 175th national meeting of the American Astronomical Society, said the satellite found nothing that would disprove the Big Bang, but the data did not unravel mysteries of the processes since.

The $150 million COBE satellite, launched Nov. 15, carried into space for the first time instruments designed to detect microwave and infrared radiation created shortly after the Big Bang, the explosion that started the universe.

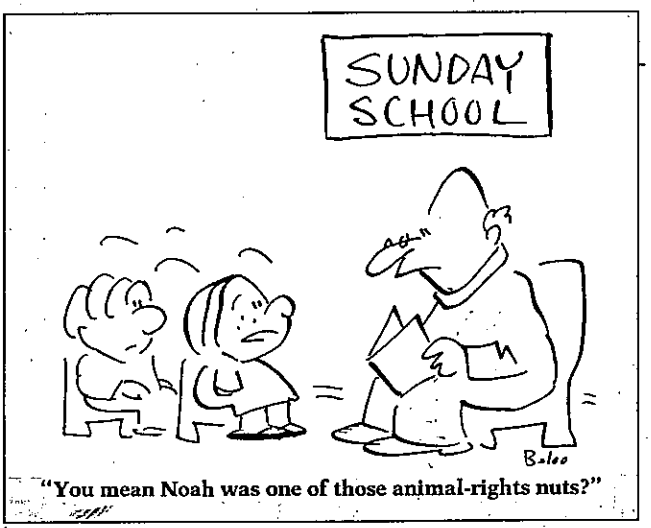
It was expected that the three satellite instruments - one for microwave and two for infrared - would find energy traces of the violent superheated processes that formed the stars, galaxies, black holes, quasars, and other structures in the universe.

Current theories are that bits of matter at many points in the universe formed small centers of gravitational attraction that drew more and more bits of matter together until the centers became so dense that stars were born.

Once a group of stars was formed, their mutual attraction, in turn, led to galaxies, and then to clusters of galaxies, and eventually to structures that form patterns reaching hundreds of millions of light years across the sky.

According to the theories, the tremendous heat from such processes would produce microwave and infrared radiation, some of which should still be detectable in the vast reaches of space.

Parallels Between Creation Accounts		
Element	**Genesis 1: 1-3**	**Genesis 2: 4-7**
Summary	In the beginning God created the heaven and the earth	These are the toledot of the heaven and earth when they were created, When the Lord God made earth and heaven,
Circumstantial clauses - two negative and one positive	Now the earth was waste and void, and darkness was upon the face of the deep, and the Spirit of God was hovering over the face of the waters.	Before any sprig of the field was in the earth, and before any grain of the field grew - because the Lord God had not caused it to rain on the earth, and there was no man to till the ground- And a mist used to go up from the ground and water the surface of the soil.
Main clause	And God said, "Let there be light," and there was light.	And there Lord God formed the man from the dust of the ground, and breathed into his nostrils the breath of life, and the man became a living being.



"You mean Noah was one of those animal-rights nuts?"

Genesis 1: 24-31 The Sixth Day

Some Theological Observations

"Us" is probably a plural of majesty, not a specific reference to the separate persons of the godhead (v. 26). It involves, however, "in germ", the doctrine of the Trinity, but should not be used as a formal proof of the Trinity. (See Allis, God Spake by Moses, p. 13).

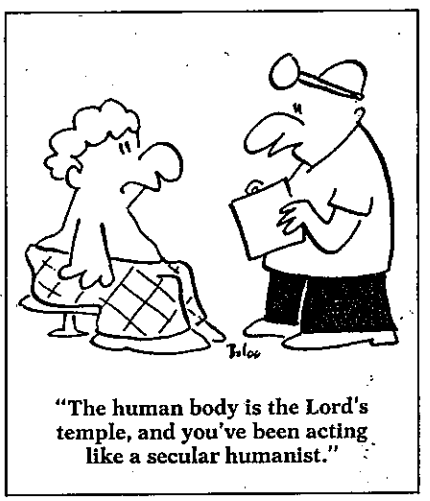
"Image" and "likeness" are essentially synonymous terms. Both indicate spiritual qualities shared by God and man (self consciousness, speech, moral discernment, etc). These distinguish man from the animals. Keil and Delitzsch call the image of God man's "spiritual personality" (vol. 1, p. 63). (See Charles Feinberg, "The Image of God," Bibliotheca Sacra [July-September 1972], pp. 235-246, esp. p. 237). In another sense man is the image of God (e.g., he rules and creates [procreates] as God does thus reflecting God).

The image of God in man was marred, but not lost, in the fall (Genesis 3).

"Rule" and "subdue" (v.28) imply a degree of sovereignty and control that God delegated to man over nature. (See Eric Sauer, King of the Earth). "The dominion which man enjoyed in the garden of Eden was a direct consequence of the image of God in him" (Davis, p. 81). Man was given authority and responsibility to regulate nature and to advance civilization. Nature was to serve man, not vice versa (cf. V. 29-30). This does not give man the right to abuse nature, however. (See "A Theology of Ecology: God's Image and the Natural World" by Gina Hens-Piazza in Biblical Theology Bulletin [October 1983], pp. 107-110).

"Man" refers to mankind, not Adam (v. 27). "Them" indicates this generic significance. God created mankind male and female; Adam was not androgynous.

This is a general account of man's creation. The more detailed account of Adam and Eve follows in 2: 4-17 and 18-25. These two accounts do not reflect a two-document composition of the creation story but the purpose of the writer to emphasize the creation of man.



"The human body is the Lord's temple, and you've been acting like a secular humanist."

Comparison of Biblical and Babylonian Creation Accounts

Genesis Account	Enuma Elish
God is seen as ultimate source of power; He transcends His creation.	Magic incantations are ultimate source of power; the gods are subject to nature. III. 101; IV. 1-26, 91*
Organized coverage of creation; systematically includes general realms of nature.	Does not include creation of vegetation, animals or light - the existence of these is assumed. Moon and stars created but not the sun. V. 2-22
Purpose: Praise to God as Lord of creation; acknowledging Him as such. A tribute to God's ultimacy and authority.	Purpose: Hymn of praise to Marduk as champion and mightiest of the gods. Creation is incidental. VI. 100ff.
Begins before things as we know them existed (Gen. 1:1); as God created, He gave names. Genesis 1:5, 8, 10	Begins before heaven and earth were named; cannot imagine situation before they existed I. 1-2
Starts with primeval deep. Hebrew: tehom Genesis 1:2	Starts with the deep - fresh water (Apsu) and salt water (Tiamat - cognate of tehom) I. 3-4
Creation given time sequence; set in blocks by "days". Genesis 1:5. 8. 13. etc.	No chronological structure of "days".
Creation by speech. Gen. 1:3, 6, 9, 11, 20	Creation from formerly existing matter. IV. 137-140; VI. 33
Waters separated above and below by firmament. Genesis 1: 6-8	Corpse of Tiamat divided in two and set up as waters above and below. IV. 137-140
Man created to rule creation. Genesis 1:28	Man created to do the service of the gods so the gods wouldn't have to work so hard. VI. 8, 34
Man created from the soil. Genesis 2:7	Man created from blood of slain hero (kingu). VI. 33

* Enuma Elish references designate tablet number and line.

God's Relation To Creation

I. Creation of The Universe and Life

A. Five views of the origin of man

1. **Atheistic evolution** (Julian Huxley) -- all forms of life evolved gradually by chance from a single cell which developed from non-living chemicals.

2. **Theistic evolution** (Teilhard de Chardin) -- God started and guided the development of all living forms by means of biological evolution. God is outside the process.

3. **Creative evolution** (Henri Bergson) -- nature possesses an imminent life force which accounts for all evolutional development (and "leaps) from within (Pan-en-theism). God is inside the process.

4. **Progressive creation** (Bernard Ramm) -- all basic forms ("kinds") of life were created directly by God at different times over millions of years.

5. **Fiat creation** (Henry Morris) -- all forms of life were created directly and immediately by God within six days some thousands of years ago.

B. Biblical account of creation

1. Summary of the Genesis account of creation

a. Who? God (1:1). Note: This is a theistic God.
b. When?

1) "In the beginning" (Gen. 1:1)
2) "In six days" (Gen. 2:1, 2; Exodus 20:11)
3) Creation was good and complete (Gen. 2:1; Jn. 5:17; Rom. 4:11; Col. 1:15; Heb. 4:3)

c. What? "Created . . .every living creature" (Gen. 1:21)

1) "Created" (bara) matter (1:1), life (1:21), and man (1:27)
2) "Made" (asah) grass, herbs, fruit (11), fish, fowl (20), sea monsters (21), cattle, creepers and beasts (24)

d. In what order? (Gen. 1)

1) Universe (1a)
2) Earth (1b)
3) Sea (6)
4) Land (9)
5) Plants (11)
6) Sea animals (20)
7) Land animals (24)
8) Man (27)

Note: This is basically the same general order of events recognized by modern science.

e. How? Ex Nihilo - "out of nothing"; "By the word of the Lord" (Ps. 33:6; Ps. 148:5), "God said" (Gen. 1:3, 6, 9, etc.,II Cor. 4:6; Heb. 1:3).

f. Why? For God's glory and for our good.

1) Not because He needed to create
   a) Not because He was lonely (cf. Trinity)
   b) Not because He was imperfect (cf. God's perfection in His attributes)

2) But because He wanted to create (freely)
   a) To declare His glory (Ps. 19:1; Col. 1:16; Rev. 4:11)
   b) To provide our good (I Tim. 6:17; Jas. 1:17)

C. Other biblical references to creation

1. Creation or beginning in general (Mk. 13:19; Rom. 1:20; II Pet. 3:4)

2. Creation of all things (Acts 17:24; Eph. 3:9; Col. 1:16; Rev. 4:11)

3. Creation of heaven and earth (Ex. 20:11; Ps. 33:6; Is. 42:5; 45:18; Jer. 32:17; 51:15; Zech. 12:1)

4. Creation of angels (Ps. 148:2, 5; Col. 1:16)

5. Creation of light and darkness (Is. 45:7)

6. Creation of sun, moon, and stars (Ps. 8:3; 148: 3-5; Is. 40:26)

7. Creation of earth, sea, and living things (Job 38:4; Prov. 8: 25-29; Jer. 27:5; Amos 4:13)

8. Creation of man from dust with breath (Job 34:15; Eccl. 12:7; Jn. 9: 1-3; Rom. 9:11; Heb. 9:27)
   Note: Man is not eternal. There is no pre-incarnate state. Man possesses contingent immortality.

9. Creation of man in God's image (Gen. 5:1; 9:6; Ps. 8:5; Eccl. 7:29; Col. 3:10; Jas. 3:9)

10. Creation of male first, then female (Matt. 19:4; I Cor. 11:9; 15:45; I Tim. 2:13)

D. Reasons for rejecting evolution

1. Biblical reasons:

   a) Historical-grammatical interpretation of Gen. 1-2
   b) Numerous biblical references to creation of man and woman as literal
   c) Jesus' references to literal creation (Matt. 19:4; Mk. 13:19)
   d) Inseparable connection between creation and redemption (Rom. 5:12,14,15)
   e) Inseparable connection between creation and ethics (Jas. 3:9)
   f) Inseparable connection between Adam and Christ (I Cor. 15:45; Heb. 2:14)

2. Philosophical and scientific reasons against evolution:

   a) Nothing does not (can not) produce something.
   b) Non-living does not produce the living.
   c) Non-personal does not produce the living (or personal).
   d) Everything produces after its kind.
   e) All basic forms of life began suddenly and abundantly.
   f) There are great gaps in the fossil record between kinds.
   g) Second Law of Thermodynamics shows things are running down. Only intelligent use of outside energy through a conversion mechanism overcomes this.

II. Preservation of the Universe

A. The biblical data (Neh. 9:6; Ps. 66:9; Acts 17:28; Col. 1:17; Heb. 1:3)

B. Theological comments

1. The universe is contingent in its existence.

   a) It came out of nothing (ex nihilo).
   b) It could therefore return to nothing.
   c) It continues to exist only because God continues to cause it to exist (Col. 1:17).

2. Contingent beings cannot exist on their own (only a necessary being [God] exists on His own).

    a) Only a necessary being is uncaused.
    b) Contingent beings are caused to exist.
    c) As long as it is contingent (dependent) it needs a cause (to depend on).
    d) Once a contingent being, always a contingent being (a necessary being cannot come to be; it must always be).
    e) Therefore, a contingent being must be kept in existence by its cause (God).

C. An evangelical response to process theology (Metaphysical basis of evolution)

1. About creation

    a) God's nature is necessary, as is His will.
    b) But it is of God's nature that creation occurs freely.
    c) Hence, creation can flow freely from a necessary Being.

2. About service

    a) Service is doing things <u>for</u> God.
    b) But service cannot be "for" God's essence; He is absolutely perfect.
    c) However, service can be "for" God's glory.
    d) Therefore, service can do something "for" God's glory. (Glory is like a magnifying glass; it doesn't change the object but simply makes its nature more manifest.)

3. About relationships

    a) All genuine relationships involve give and take, but not necessarily mutual dependence.
    b) God can love and be loved (though He doesn't <u>depend</u> on our love; He simply <u>desires</u> it).
    c) Therefore, God can enter into genuine relationships. (The Creator can't depend on the creature for His existence. Existential dependence must be one way.)

4. About foreknowledge

    a) A timeless Being does not <u>foresee</u>; He only sees.
    b) Hence, God sees the future in His eternal <u>now</u>. In salvation He has always known you.
    c) This is not a disadvantage; it solves the problem of <u>pre</u>destination (Bible speaks of <u>fore</u>knowledge only from man's perspective.)

5. About creation

   a) A timeless God did not create in time.
   b) Rather, He performs the creation of time.
   c) There was no time prior to creation; time began with the changing world.

6. About personality

   a) A timeless God is eternally and consistently who He is.
   b) This God responds to us with changeless and consistent love, which is the most personal of all.
   c) Hence, timelessness increases the personalness of God's response to us.

7. About worship

   a) Timelessness implies God is absolutely perfect.
   b) What is absolutely perfect is most worthy of our worship.
   c) Hence, timelessness makes God most worthy of worship. (It is anthropomorphic arrogance to hold that God must be relatively imperfect [like us] before He is worthy of our worship.)

8. About the incarnation

   a) The Eternal does not become temporal in the incarnation. (This is contradictory and heretical.)
   b) The essence of God did not literally become human; rather, the second person of the Godhead assumed a second and distinct nature. The incarnation was not a subtraction of deity but an addition of humanity.
   c) Hence, there is no impossibility involved.

9. About biblical language

   a) The Bible uses many figures of speech and often speaks from man's perspective.
   b) References to God changing and being temporal fit into this category.
   c) The Bible also speaks of God as being beyond time (Ex.3:14; Heb.1:3;Jude 25).
   d) It is the task of systematic theology to make a consistent whole of all the Bible teaches. (Timelessness does this best. A temporal "God" wouldn't be god; he would need a Creator.)

10. Sources of error in process theology

a) It builds its system on the anthropomorphic dipolar model of body/soul.
b) It replaces the essential unchangeable attributes of God with His relational acts.
c) It fails to understand the analogy of being and the contingent nature of finite beings.
d. It makes God's perfection subject to man's moral efforts.

WORLDVIEWS IN COLLISION

"As never before, humanity is confronted with two world views, two life views, the divergences between which are quite plain in every department of interpretation. They stand so far apart today that each denies the right of the other to life. . . ."
-- Carl F. H. Henry

"Religious belief should be assessed as a rounded whole rather than taken in stark isolation. Christianity, for example, like other world faiths, is a complex, large-scale system of belief which must be seen as a whole before it is assessed. To break it up into disconnected parts is to mutilate and distort its true character."
William J. Abraham

"It need not further be denied that between this view of the world involved in Christianity, and what is sometimes termed 'the modern view of the world,' there exists a deep and radical antagonism."
-- James Orr

Ex Nihilo Creation

I. It's Biblical Basis

Genesis 1:1 Bara plus context equals ex nihilo (cf, Jo. 1:2; Col. 1:16).
John 17:5 - "before the world was made"
Romans 4:17 - "God...who calls into existence the things that do not exist."
II Cor. 4:6 - "For God who said, 'light shall shine out of the darkness...'"
Col. 1:17 - "He is before all things, and by him all things hold together."
Hebrews 1:2 - "...through whom also He created the world (ages)."
Hebrews 11:3 - "the world was created by the word of God, so that what is seen was made out of things which do not appear."
Rev. 4:11 - "Thou didst create all things, and because of thy will they existed and were created."

II. Historical Origin and Development

A. Hebrew Old Testament (Gen. 1:1; Deut. 4:32; Is. 40:26; 45:12; Amos 4:13; Mal. 2:10).

B. Jewish Philosopher Philo (wrongly assumed it to come from Plato's Timaeus).

C. Early Fathers, Augustine, Anselm, and Aquinas held to it.

III. Meaning of Ex Nihilo Creation

A. Positive meaning: contingency, or dependency of all creation on God.

B. Meaning by contrast.

1. Ex Deo - creation out of God (Pantheism). This is impossible because:

   a. Creation is contingent and God is necessary.
   b. The contingent cannot be part of the necessary.
   c. Further, God is simple and one in His being and hence he cannot be multiple and many [or, whatever is multiple or many (as world is) cannot be one absolutely simple being].

2. Ex Hulas - creation out of some pre-existent stuff (matter) - Dualism. Impossible since:

   a. The "stuff" cannot be infinite and necessary; there can be only one infinite and necessary being.
   b. If the "stuff" is contingent, then it must be caused to exist by God.

3. Ex Nihilo - creation out of nothing (i.e., neither out of God nor out of some other "stuff").

C. Meaning as a negative expression.

1. It means "God did not create the world out of something."
2. "What did God create the world out of?" is a meaningless or unanswerable question. It assumes there was something out of which the world was created when there was nothing.

D. Illustrations of Ex Nihilo creation (all of which are inadequate in some sense).

1. "Conjuring up" a mental image.
2. "Uttering" a word.
3. An act of free will.

Note: a. No pre-existing "stuff" is used in these cases.
b. No piece of the mind or will is used up in the process of producing a thought, word, or action.
c. Difference: creation is more than a mental word. (It involves the page and the print as well!)

E. Some Problems

1. It is not contradictory to say "something comes from nothing"? No. "Nothing caused something" is impossible. But "something (God) caused something (creation) where there was nothing" is not contradictory.

2. Where did the world exist before it was created? It never actually existed anywhere as a world.

a. World pre-"existed" as an idea in the mind of God before it was created (as a painting "exists" in the painter's mind before it was painted).
b. World is present in the active power of God before He exercised it (as a push-up "exists" in a muscle before one does it). The thing and its potential to exist are concreated together.
c. Can creation ex nihilo be eternal? Philosophically, Aquinas says, yes; Augustinians say, no. Biblically, Bible says God created time; hence, world had a beginning (Heb. 1:2; Jude 25).

Creation/Evolution
An Overview

Ray Bohlin

I. **The origins debate is clouded in confusion.**

The meaning of such common words such as evolution and science are often distorted to the advantage of a particular point of view. In regards to science it is helpful to distinguish between what has been called operation science and origin science.[1]

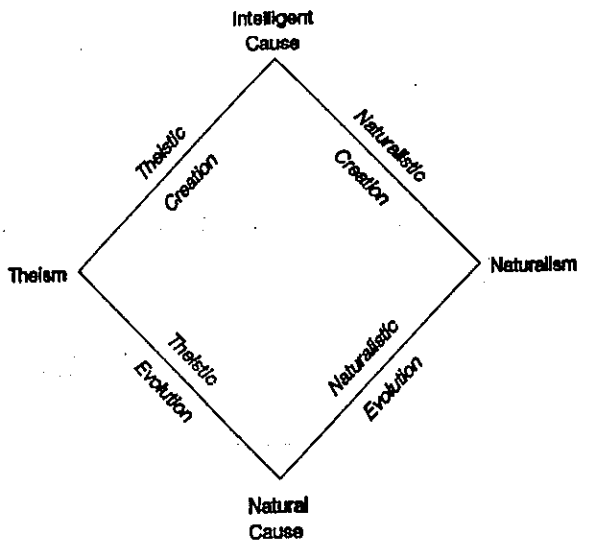
A. ***Operation Science***

Operation science is the usual kind of science where we can perform an experiment and repeat it over and over again to confirm the initial result. Gravity is a "fact" because apples continue to fall from trees. Noone has ever observed an apple fall up.

B. ***Origin Science***

Origin science however involves events that occurred once in the past and we are unable to repeat the event. All we can do is assemble what evidence we have for the event (i.e., the appearance of humans on this planet) and construct a plausible scenario or hypothesis. That humans evolved from human ancestors is a gypothesis which attempts to explain the evidence from paleontology, biochemistry, genetics, morphology, etc. It is not and never can be a fact of science.

II. **The major clash of worldviews in the origins debate concerns the worldviews of theism and naturalism. Pantheism at this point enters the discussion primarily as a subset of naturalism. The chart below will help to explain.**



A. ***Theistic Creation***

Origin events result from the supernatural intervention of an intelligent creator.

B. ***Theistic Evolution***

God created through natural processes alone.

C. ***Naturalistic Creation***

The creator lies within the natural universe, i.e., pantheism.

D. ***Naturalistic Evolution***

All origins events resulted from purely natural processes.[2]

The origins debate is primarily between theistic creation and naturalistic evolution with the other two views unable to decide which side they are cheering for.

II. **The universe is finite and designed for life.**

A. ***The unique physics (universal coincidences) of the universe make life possible.***[3]

1. *If the four coupling constants—gravitional, strong nuclear, weak nuclear, and electromagnetic—were slightly larger or smaller, the particles, atoms, and molecules necessary for life would not exist, and there would be no suns "our" size that could support life.*
2. *The ratio of electron to proton mass allows for life's necessary molecules.*
3. *If the speed of light were faster or slower, all the fine structure constants would be altered, making life impossible.*
4. *The Be, C, and O nuclear energy levels are just right to allow the formation of heavier elements.*
5. *"A superintellect has monkeyed with physics, as well as with chemistry and biology."—Fred Hoyle*

B. ***The interrelationship of the earth, sun, and moon have been designed to support life.***[4]

1. *If the mass of the sun were much larger, the sun would burn too rapidly. If its mass were much less, the earth would need to be closer in proximity to it, which would disrupt the rotation of the earth.*
2. *If the earth were closer to the sun, the temperatures would be too warm for a stable water cycle. If the earth were farther away, the earth would be too cool for a stable water cycle.*
3. *Other factors are just right for sustaining life on earth, such as the thickness of the crust, the earth's rotational period, the gravitational interaction with the moon, the earth's magnetic field, the earth's axial tilt, the oxygen-to-nitrogen ratio, the levels of carbon dioxide, water vapor, and ozone, and many others.*
4. *Astronomer Hugh Ross concludes in his book* ***The Fingerprint of God,*** *concerning the uniqueness of the earth, that "not even one planet would be expected, by natural processes alone, to possess the necessary conditions to sustain life."*

C. ***The Big Bang theory, if true, holds tremendous implications concerning the existence of God.***

1. *The universe began as a particle that was infinitely dense and occupied no space.*[5]

2. *Some find the concept of a beginning quite compelling:*

   "It is simpler to postulate creation *ex nihilo*—Divine will constituting Nature from nothingness."—Edmund Whitaker[6]

   "As to the first cause of the universe, in the context of expansion, that is left for the reader to insert, but our picture is incomplete without Him."—Edward Milne[7]

3. *Yet others are repulsed by the notion of a beginning.*

   "The notion of a beginning is repugnant to me. . . . I simply do not believe that the present order of things started off with a bang . . . the expanding universe is preposterous . . . incredible . . . it leaves me cold."—Arthur Eddington[8]

   "It is such a strange conclusion . . . it cannot really be true."—Allan Sandage[9]

   Their rejection of the Big Bang theory resides in their philosophical objection that the universe is not infinitely old. If the universe did not always exist, then something non-material or spiritual must be eternal. In reality, it is the conclusion that the universe owes its existence to an eternal spiritual entity that the cosmologists find strange, incredible, and preposterous.

4. *Scientists now find themselves in essential agreement with Genesis 1:1.*

   "For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries."—Robert Jastrow[10]

   "In the beginning, God created the heavens and the earth." (Gen. 1:1)

   At present there is no valid scientific argument which can refute the truth contained in the first verse of the Bible. Modern science has come full circle to the validity of the theistic worldview which spawned its existence in the first place.

5. *However, some scientists will always try to push God to the meaningless periphery of the universe.*

   "The Cosmos is all that is or ever was or ever will be."—Carl Sagan[11]

   "But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be. What place, then, for a creator."—Stephen Hawking[12]

   The astronomer Sagan and the theoretical physicist Hawking are among the many investigators who continue to search for a way to explain the universe apart from God. Their world view does not contain room for God or at least the God of the Bible. Mankind will continue to search for a way to explain the universe apart from the Creator.

6. *Stephen Hawking even suggests the possibility that the formulation of a unified theory of physics may even explain the "why" of the universe. But science cannot answer these questions and it may not be wise even to make the attempt.*

   "If we find the answer to that, it would be the ultimate triumph of human reason—for then we would know the mind of God."—Stephen Hawking[13]

   "You surely shall not die! For God knows that in the day you eat from it your eyes will be opened, *and you will be like God*, knowing good and evil.—The Serpent to Eve (Gen. 3:4–5)

   Thinking the thoughts of God after Him, as Newton said, is entirely different from "knowing the mind of God."

III. **The chemical evolution of life is a much a mystery today as it was in the time of Darwin. The evidence is mounting that life is the product of a creative intelligence.**

A. ***The myth of the prebiotic soup***[14]

1. The original scenario for chemical evolution on earth called for an atmosphere rich in methane, ammonia, hydrogen, and water, yet devoid of oxygen. These gases would be sparked, heated, shocked, or irradiated to form the building blocks of life such as amino acids, sugars, lipids, and nitrogenous bases. These building blocks would rain on the earth into the oceans where they would accumulate and polymerize to form proteins, DNA, RNA, phospholipids, and carbohydrates. Over time these macromolecules would arrange themselves into living, replicating cells.
2. Chemical and geological evidence now shows that the early atmosphere was not reducing and may have contained some oxygen. The likely constituents were carbon dioxide, nitrogen gas, and water, with a few traces of other neutral gases.
3. This mixture would produce mostly non-biological organic molecules. Even if biological building blocks were produced, they would have either been destroyed by the same energy sources that made them or they would be eliminated by cross-reacting with the other molecules rather than polymerizing with themselves.
4. "Furthermore, no geological evidence indicates an organic soup, even a small organic pond, ever existed on this planet. It is becoming clear that however life began on earth, the usually conceived notion that life emerged from an oceanic soup of organic chemicals is a most implausible hypothesis. We may therefore with fairness call this scenario, 'the myth of the prebiotic soup.'"—Thaxton, Bradley and Olsen[15]

B. ***Prebiotic Simulation Experiments***

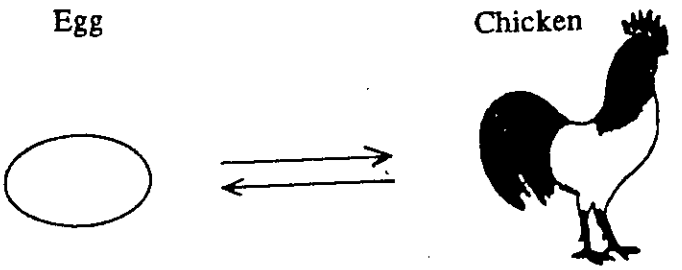
All of the prebiotic simulation experiments have been influenced by the investigator to achieve the desired result either by using isolated energy sources, exaggerated levels of energy input, unrealistically purified reactants, removal of the products from the destructive effects of the energy source, and the use of implausible "photosensitizers" which absorb harmful sources of radiation.[16]

Even if life is synthesized in the laboratory, it does not mean that it could have happened this way on the early earth.

C. *Macromolecules to Cells*

The biggest chasm which must be crossed by chemical evolution scenarios is the assembly of biological macromolecules into a functioning replicating cell.

1. In order for DNA to be replicated, transcribed, and translated into protein, a host of specific proteins must already be present. It is a sophisticated "Which came first, the chicken or the egg?" question.



DNA ⇌ PROTEIN

2. The odds of achieving a 101-amino-acid-specified-sequence protein in five billion years by shuffling the sequences of proteins contained in a layer around the earth one meter thick at a rate of 10^{14} per second is only $1/10^{45}$. The chances of obtaining two-thousand proteins by random shuffling is $1/10^{40,000}$. There is a statistical probability that a pot of water will freeze when placed on a lighted stove, but it is not realistic.[17]

3. Since RNA has some catalytic properties, some researchers thought that RNA may have come first. But RNA is difficult to synthesize under prebiotic conditions; it does not self-replicate easily; a key component, the sugar ribose, inhibits RNA synthesis; and another crucial ingredient, phosphorous, is a rare substance in nature. Experiments simulating the early stages of the RNA world are too complicated to represent plausible prebiotic scenarios.[18]

D. *Cell Complexity*

The cell is an extremely complex and highly ordered machine. Machines do not come about without a well-thought-out plan preceding them. Though there was plenty of energy available on the early earth, there was no mechanism to channel the energy into performing the work necessary to construct an ordered, complex, and specific machine.

E. *Informational Codes*

Informational codes require intelligence to construct the code and to transmit the infromation from a source to a receiver. DNA is such a code, therefore, its origin requires an initial creative intelligence.[19]

1. The use of words such as *code, transcription,* and *translation* in reference to the structure and function of DNA are not just convenient analogies. These language terms accurately describe what is going on.
2. Information scientists have shown that informational codes do not arise from noise or by chance, but only from intelligence.
3. Some level of order does arise in nature due to the physical properties of the matter involved. Ripples in the sand along a river bank result from the physical properties of the sand and moving water. If further down the river bank, however, we see "John Loves Mary" scratched in the sand, we intuitively understand that this did not occur naturally but is the result of intelligence communicating a message.

F. *Discounting the Evidence*

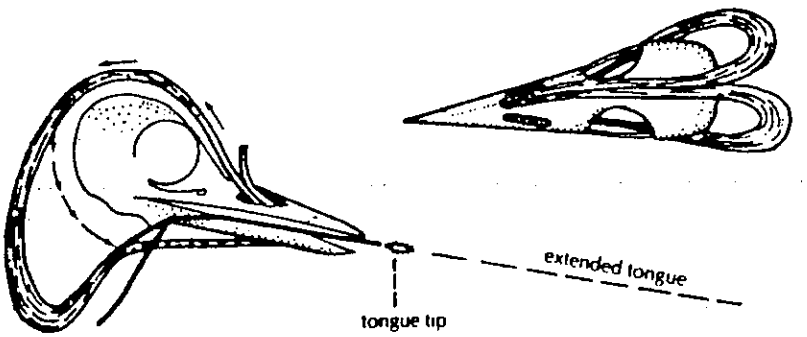
Just as in the origin of the universe question, there will always be those who, because of their commitment to a naturalistic world view, will discount any evidence of the necessity of intelligence in the origin-of-life scenario.

Stanley Miller, who agrees that the origin-of-life field needs a dramatic discovery to put a curb on the rampant speculation, was asked if he ever entertained the possibility that genesis was a miracle not reproducible by mere humans. Not at all, Miller replied, "I think we just haven't learned the right tricks yet. . . . When we find the answer, it will probably be so damned simple that we'll all say, 'Why didn't I think of that before?'"[20]

IV. **The complexity, uniqueness, and diversity of life forms provide difficult challenges to the Darwinian view that all life is descended from a common ancestor.**

A. ***The living world is full of amazing adaptive strategies that defy evolutionary explanations.***

1. Woodpeckers possess numerous adaptations to accomodate them to their unique life history, the most incredible of which is the tongue. In the woodpecker, the tongue loops down into the throat, under the skull, around the back of the skull, beneath the skin, and over the top between the eyes, terminating just below the eye socket. In some species the tongue extends into the right nostril.[21]

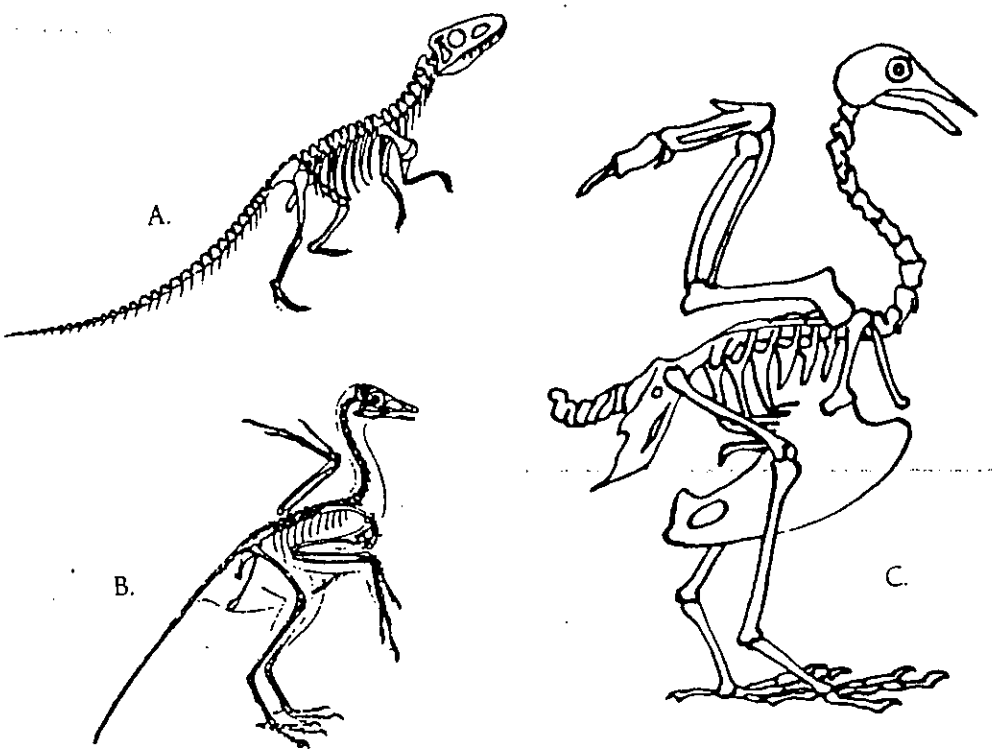


2. The elaborate display of the peacock's tail feathers has always held a certain fascination. While the display is beautiful, it also attracts predators and can make escape difficult. Evolutionists explain it by pointing out its ability to attract a mate. But one has to wonder why selection would favor a peahen that is attracted to a peacock with a display that is life-threatening.[22]

B. ***Nearly all species and adaptive structures appear suddenly in the fossil record with few if any predicted evolutionary transitions.***[23]

1. *Swimming (whale, seals, turtles, etc.) and flying (insects, pterosaurs, birds, and bats) adaptations appear suddenly in the fossil record with no transitions.*

2. *The fossil bird Archeopteryx is a curious mosaic of "reptilian" and avian characteristics that do not illuminate the reptile-to-bird transition. "The origin of birds is largely a matter of deduction. There is no fossil evidence of the stages through which the remarkable change from reptile to bird was achieved."*[24]



Skeletons of a Triassic thecodont (A) representing the presumed reptile ancestor of birds, the Jurassic fossil bird, *Archaeopteryx* (B) and a modern bird (C).

3. *The lack of transitional forms is not just characteristic of these few examples, but is common throughout the entire fossil record.*

Whatever view one wishes to take of the evidence of paleontology, it does not provide convincing grounds for believing that the phenomenon of life conforms to a continuous pattern. The gaps have not been explained away.[25]

All the fossils which have been dug up and are claimed to be ancestors—we haven't the faintest idea whether they are ancestors.[26]

4. *Some organisms termed living fossils survive today unchanged for what appears to be millions of years. Creatures such as aardvarks, alligators, snapping turtles, sturgeons, bowfin fishes, and horseshoe crabs have been around for 20 to 230 million years. How have these and others creatures survived untouched through the eons while so many others have changed drastically, and 99 percent have become extinct?*[27]

C. ***Evolution is a mechanistic theory that is still without a mechanism to account for all the complexities of living organisms.***

1. *Neo-Darwinism is a slow and gradual process that is said to be fueled by mutation and natural selection.*[28]

   a. Bacteria, fruit flies, and certain plants have been bombarded with various mutagens. In the end, the same species of organism is still with us though somewhat hampered in its ability to survive on its own.

   b. Natural selection is a conservative process not a creative one. Artificial selection demonstrates that there are limits to the amount of change an organism can experience.

2. *Punctuated equilibrium postulates that evolutionary change takes place rapidly during the speciation process (punctuated) followed by long periods of little or no change termed stasis (equilibrium).*[29]

   a. Speciation is unobservable and untestable in the present as well as in the fossil record.

   b. Punctuated equilibrium is actually a description of the fossil record that attempts to explain the gaps in the fossil record. No real biological explanation exists for rapid change during speciation.

3. *There is no satisfactory explanation for the acquisition of new genes that code for proteins the cell did not possess previously. There are hundreds of genes present in eukaryotic cells that are not found in prokaryotic cells.*[30]

D. ***The Blind Watchmaker***

Richard Dawkins book, *The Blind Watchmaker,* fervently asserts that "Natural selection is the blind watchmaker, blind because it does not see ahead, does not plan consequences, has no purpose in view. Yet the living results of natural selection overwhelmingly impress us with the appearance of design as if by a master watchmake, impress us with the illusion of design and planning."[31] Mutation and natural selection build complex adaptations such as flight by numerous almost imperceptible changes over thousands and millions of years. But these scenarios are without experimental and observational support.[32]

1. *There is no way to know whether a long serious of micromutations is a greater or lesser miracle than making the change all in one jump.*

2. *The sheer number of favorable mutations required is incalculable. A bird not only needs wings, but also feathers, lungs, bone structure, brain morphology, etc. yet they all occur blindly.*

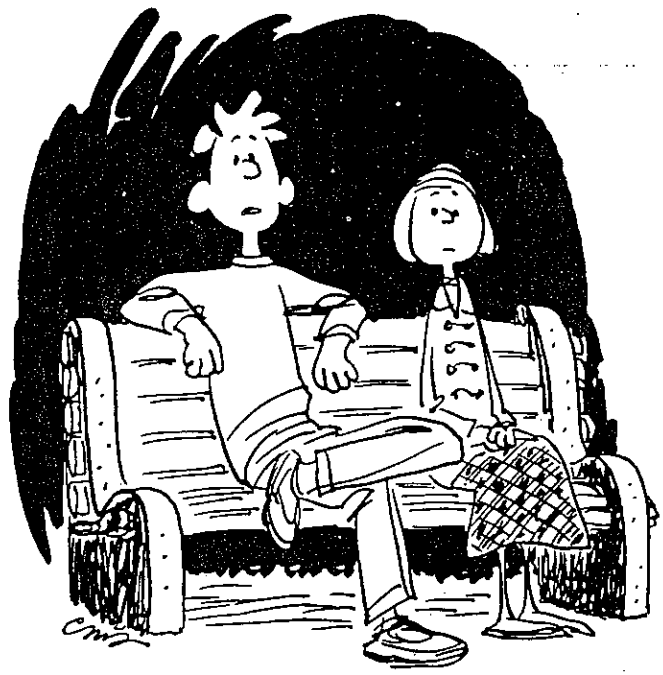
3. *Natural selection constantly runs into problems caused by the fact that mutations often affect more than one characteristic. Selection for one slightly favorable trait may have to be balanced with several other deleterious traits cused by the same mutation. Comparisons to artificial selection are superfluous since artificial selection is purposeful and has shown time and again that biological variation is anything but limitless.*

E. ***Beauty is pervasive in the natural world, from subatomic particles to crystals to biochemical pathways to butterflies to tropical jungles to the planets to the universe.***[33]

1. *If beauty were the result of chance, it would be extremely rare.*
2. *If beauty were the result of necessity, why would we be soothed by birdsongs used to attract mates, establish territories, and threaten enemies?*
3. *It seems reasonable to assume that we appreciate the beauty in nature because we have a mind patterned after the intelligence that is responsible for the beauty.*

V. **As we observe the order, complexity, and diversity of the natural world, it becomes even more difficult to comprehend a mechanistic evolutionary cause to explain it all.**

The elements of design are so obvious that even evolutionists have a hard time keeping the word *design* out of their observational descriptions. When all the evidence is considered, a theory of origins based on intelligent design is a logical and consistent alternative.



"Do you ever look up at the stars and wonder what's beyond the space out there beyond what is out there beyond whatever is out there?"

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Hugh Ross is a Christian astronomer and apologist. His book summarizes the various cosmologies available today and critiques them. His perspective on astronomical and astrophysical observations is extremely valuable. Dr. Ross's overall purpose is to declare that the heavens declare that God exists. He also holds to an old universe and an old earth. He believes that the order of creation events in Genesis follows the order of events according to Big Bang cosmology.

Morris, Henry and Gary Parker. *What is Creation Science?* San Diego, Calif.: Creation-Life, 1982.
This book has since been revised and updated. Morris and Parker present the standard Institute for Creation Research (ICR) model. A young universe and earth, recent creation, and a global flood that explains the fossil record. Hugh Ross and ICR don't agree with each other very much. Skimming these two books will make that clear. Too many creationists are allowing the age question to interfere with the real battle with naturalistic evolution.

Thaxton, Charles B., Walter L. Bradley, and Roger L. Olsen. *The Mystery of Life's Origin*. New York: Philosophical Library, 1984.
This is a powerful apologetic for the inherent weaknesses of all chemical evolution scenarios from chemical, geological, and thermodynamic viewpoints. In the epilogue, the authors argue persuasively for the legitamacy for special creation by a creator beyond the cosmos. Very technical.

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"VITAL ARTICLES ON SCIENCE/CREATION"
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No. 136 — EVOLUTION: THE CHANGING SCENE

By Duane T. Gish, Ph.D.

Prof. Derek Ager of the University at Swansea, Wales, in *Proc. Geol. Assoc.* Vol. 87, p. 132 (1976) has stated

"It must be significant that nearly all the evolutionary stories I learned as a student, from Trueman's *Ostrea/Gryphea* to Carruther's *Raphrentis delanouei*, have now been 'debunked.' Similarly, my own experience of more than twenty years looking for evolutionary lineages among the Mesozoic Brachiopoda has proved them equally elusive."

This admission by Prof. Ager (no friend of creationists) fits in very well with the title of this article—a significant part of the changing scene in evolutionary circles is the changing attitude of evolutionists concerning the fossil record—more and more are now admitting that the missing links are still missing, that they have little or no evidence for gradual change in the fossil record.

In his article in *Natural History* 86:22 (1977) entitled "The Return of Hopeful Monsters," Stephen J. Gould, leading spokesman for evolutionists in the U.S. today, said that

"The fossil record with its abrupt transitions offers no support for gradual change. . ."

"All paleontologists know that the fossil record contains precious little in the way of intermediate forms; transitions between major groups are characteristically abrupt."

From an article published in *Paleobiology*, Vol. 3 (1977) by S.J. Gould and Niles Eldredge we find the following on p. 147:

"At the higher level of evolutionary transition between basic morphological designs, gradualism has always been in trouble, though it remains the 'official' position of most Western evolutionists. Smooth intermediates between *Baupläne* are almost impossible to construct, even in thought experiments; there is certainly no evidence for them in the fossil record (curious mosaics like *Archaeopteryx* do not count)."

In his review of Steven Stanley's book *Macroevolution* by D.S. Woodruff (*Science* 208:716 (1980)), Woodruff says (I believe he is quoting Stanley):

"But fossil species remain unchanged throughout most of their history and the record fails to contain a single example of a significant transition."

The clatter has become so loud that even the popular press has picked it up. *Newsweek* in an article entitled "Is Man a Subtle Accident?" published Nov. 3, 1980, stated

"The missing link between man and the apes, whose absence has comforted religious fundamentalists since the days of Darwin, is merely the most glamorous of a whole hierarchy of phantom creatures. . . The more scientists have searched for the transitional forms that lie between species, the more they have been frustrated."

Some evolutionists have come to realize that the fossil record is so bad relative to evolution theory that they want to avoid it entirely as support for evolution. Mark Ridley, a British evolutionist, tells us in his article published in *New Scientist* 90:832 (1981) that

"No real evolutionist, whether gradualist or punctuationist, uses the fossil record as evidence in favour of the theory of evolution as opposed to special creation."

One might immediately wonder, then, where does Ridley believe we find all the marvelous evidence for the "fact of evolution?" Why, from the "observed evolution of species, from biogeography, and from the hierarchical structure of taxonomy," Ridley tells us. He apparently disagrees with his fellow evolutionist and the most distinguished of all French zoologists, Pierre Grassé, who states in his book *Evolution of Living Organisms* (English translation, Academic Press, New York, 1977, p. 4)

"Naturalists must remember that the process of evolution is revealed only through fossil forms. A knowledge of paleontology is, therefore, a prerequisite; only paleontology can provide them with the evidence of evolution and reveal its course or mechanisms. Neither the examination of present beings, nor imagination, nor theories can serve as a substitute for paleontological documents."

What Grassé says in his book is that biology offers us no help in our attempt to understand the mechanism of evolution. He says that evolution is a mystery about which little is, and perhaps can be, known. He says certainly mutations and natural selection cannot possibly provide that mechanism.

Many others in more recent times, in view of the growing knowledge that the fossil record produces no evidence for gradual change and that the gaps in the fossil record, particularly at the level of the higher categories, are systematic and almost always large, are now abandoning the neo-Darwinian theory of slow gradual change. Gould has said that as a general principle, neo-Darwinism is dead, although it is still textbook orthodoxy.

In his comments on a new mechanism for evolution postulated by Edward Wiley and Daniel Brooks, Roger Lewin (*Science* 217:1239-1240, 1982) says

"Natural selection, a central feature of neo-Darwinism, is allowed for in Brooks and Wiley's theory, but only as a minor influence. 'It can affect survivorship' says Brooks. 'It can weed out some of the com-

plexity and so slow down the information decay that results in speciation. It may have a stabilizing effect, but it does not promote speciation. It is not a creative force as many people have suggested.' "

Let me point out first of all that all of this sounds familiar—it is the source that is astounding. The view just stated is precisely what has been said by creationists ever since Edward Blyth in 1830. Natural selection is a stabilizing force. It is not a creative force, the driving mechanism of evolution, which has been responsible for the conversion of one organism into another, all the way from amoeba to man. But now, notice who is saying this—evolutionists!

Even more, they are saying that natural selection is not only *not* the mechanism for evolution, it actually retards the evolutionary process. They say that natural selection slows down the information decay that results in speciation. That statement is absolutely astounding on two points.

First of all, their admission that natural selection not only is *not* the mechanism of evolution but actually acts contrary to evolution is most revealing. Secondly, that speciation, and thus evolution, occurs by the decay of information. Now that is really startling! We creationists have long pressed the point that the random processes supposedly at work in evolution cannot possibly account for the origin of new information required for increase in complexity and the generation of new functions and organs required by evolution. Evolutionists have, on the contrary, insisted that this was possible.

Now Wiley and Brooks are claiming that all of us were wrong, both creationists and evolutionists. Evolution, from the primordial single-celled organisms to the millions of present-day organisms, including man with his 30 trillion cells of over 200 varieties, including a three-pound human brain with twelve billion brain cells and 120 trillion connections, is the result of the decay of information!

Whatever anyone might think of that theory, certainly we can all recognize that they are rejecting Darwinism. As I have said earlier, many others are doing the same. *Science Digest* (Sept.-Oct. 1980, p. 55) had an article entitled "Was Darwin Wrong?" The British Broadcasting Company produced a television program a year or two ago entitled "Did Darwin Get It Wrong?" Stephen J. Gould, Niles Eldredge, Steven Stanley and others have abandoned neo-Darwinism for what they call "punctuated equilibrium." They suggest that what we see in the fossil record is that species abruptly appear, fully-formed. They remain virtually unchanged for the duration of their existence, up to ten million years or even more, and they then abruptly disappear and are replaced by other species that also abruptly appear fully formed with no evidence of transitional forms.

They suggest that the evolutionary transitions occur somewhere out in an isolated area on the periphery of the main population and that the transitions occur very rapidly in small populations. The change is so rapid and the numbers are so small, we are told, that there are no opportunities for fossilization of the transitional forms.

Let me point out, first of all, that this notion of punctuated equilibrium

is no mechanism at all. It is simply a new scenario. They are saying that since we don't find transitional forms, evolution could not have occurred slowly and gradually, so obviously, then, it must have occurred rapidly. How and why evolution occurs so rapidly, no one knows. As a matter of fact, the idea that multiplied millions of rapid bursts of evolution have occurred is contrary to the science of modern genetics. The genetic apparatus of a lizard, for example, is totally devoted to producing another lizard. The idea that by some random evolutionary process the genetic apparatus of a lizard could be rapidly reorganized to produce something really significantly different is clearly contrary to everything we know. Evolutionists simply have no mechanism for evolution.

Secondly, the notion of punctuated equilibrium doesn't solve the really serious problem evolutionists have with the fossil record. In fact, it doesn't even address that problem. The idea of punctuated equilibrium was invented to explain the lack of transitional forms between species. But that is not the real problem. The really serious problem is the absence of transitional forms between the higher categories, that is, between families, orders, classes and phyla. The total absence, for example, of transitional forms between invertebrates and the fishes, a vast gulf supposedly spanning 100 million years. We have no transitional forms between basic morphological designs, or what creationists call the created kinds.

Evolutionists find themselves in a most embarrassing position today. They can find neither the transitional forms in the fossil record that their theory demands nor can they find a mechanism to explain how the evolutionary process supposedly occurred. I am reminded of what Owl said in the Pogo comic strip. He said, "If we had some ham, we could have ham and eggs for breakfast—if we had some eggs!"

Certainly we are witnessing a changing scene in evolutionary circles today. They are finally admitting that the fossil record shows little or no evidence for gradual change (which is precisely what we must predict on the basis of creation). Many are now rejecting Darwinism and are suggesting radical new theories concerning the evolutionary process. But, almost all chorus in unison—evolution is a fact!

Isn't that amazing! One hundred and twenty-years after Darwin the missing links are still missing, and that wonderful, marvelous Darwinian mechanism that was responsible for swinging the majority of scientists over to evolution is now becoming rapidly discredited. Yet, somehow, we are told, everyone knows that evolution is a fact! Colin Patterson, senior paleontologist at the British Museum of Natural History, said in a talk he gave at the American Museum of Natural History, November 5, 1981, that he now realizes that in accepting evolution he had moved from science into faith. In a recent BBC program Dr. Patterson stated that all we really have of the evolutionary phylogenetic tree are the tips of the branches. All else—the filling in of the trunk and of the branches —is simply story telling of one kind or another.

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VITAL ARTICLES ON SCIENCE/CREATION
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No. 180 — A THEORY IN CRISIS[1]

by John W. Oller, Jr., Ph.D.*

The 1986 book by Michael Denton, *Evolution: A Theory in Crisis,* is a secular critique of orthodox Darwinism. It is thoughtful, logical, empirical, and well-written. Denton is sympathetic and fair, showing rare insight and compassion towards Charles Darwin. He distinguishes *microevolution* from *macroevolution.* The first occurs within genotypes. Darwin's Galapagos finches illustrate microevolution, as does the circumpolar overlap among species of gulls, and the many varieties of fruit flies in the Hawaiian islands. However, selective breeding of pigeons, chickens, turkeys, cattle, horses, dogs, cats, and many other domestic animals yields similar results over less time.

Macroevolution, the second type, had to occur if evolution were to get to the first cell, or to leap across genotypes, say, from a reptile to a bird. While microevolution is evident in the geographical distribution of many living species[2] and in selective breeding, it sustains only Darwin's *special* theory of evolution—variation within genotypes. The *general* theory, change across types on the other hand, (macroevolution) requires upward rather than lateral movement.

For macroevolution the problem is how fully developed viable life-forms might arise completely by accident. Denton cites Monod who said, "Chance *alone* is at the source of every innovation, of all creation in the biosphere. Pure chance, absolutely free but blind."[3] Chance supposedly gave rise to the first organism—perhaps a bacterium, alga, or protozoan. Later, the theory says, chance resulted in complex invertebrates and plants, followed by fish, then amphibians, reptiles, birds, and, finally, mammals.

According to Denton, proof of such a sequence requires at least one of two kinds of evidence: either an unbroken chain of transitional fossils or surviving intermediates, or; plausible reconstructions of such series together with their respective ecological niches. The trick is to show how each link could be viable long enough for the next to get going. Only by establishing complete transitional series can the hypothesized connectedness in the hierarchy of genotypes be made plausible—empirical proof, of course, is a much taller order. Here the issue is mere plausibility. If such transitions ever happened, intermediate forms should be found in the fossils and in living organisms. Existing classes should overlap. Clear boundaries ought to be exceptional rather than normative.

Though Darwin hoped fossil transitions would appear eventually, none did. Only trivial cases of microevolution, hardly rivaling selective breeding, were evident. Nor for more than a hundred years would any accurate measure of distances between existing classes become possible.

Or, take the Coelacanth. On the basis of fossil evidence, evolutionists believed it was intermediate between fish and amphibia. Reconstructions showed Coelacanth to have both amphibian and fish-like characteristics. Later, live Coelacanths turned up in the Indian Ocean near Cape Province, South Africa. They were fish. The reconstructions had been wrong. All of which shows that fossils provide a poor basis for detailed inferences about proposed links between classes.

However, Denton points out that advances in microbiology make possible a new sort of evidence. It is now possible to compare directly the basic building blocks—the proteins—of living things. Denton notes that proteins determine "all the biology of an organism, all its anatomical features, its physiological and metabolic functions. . . ."[4] It is hard to believe that protein structure and evolution could be unrelated. Denton writes:

> The amino acid sequence of a protein from two different organisms can be readily compared by aligning the two sequences and counting the number of positions where the chains differ.[5]

And these differences

> can be quantified exactly and provide an entirely novel approach to measuring differences between species. . . .
>
> As work continued in this field, it became clear that each particular protein had a slightly different sequence in different species and that closely related species had closely related sequences. When the haemoglobin sequences in different mammals, such as man and dog, were compared the sequential divergence was about twenty percent, while, when the haemoglobin in two dissimilar species such as man and carp were compared, the sequential divergence was found to be about fifty percent.[6]

Such comparisons make possible the testing of hypotheses suggested by neo-Darwinian orthodoxy. For instance, suppose bacteria have been around much longer than multicellular species, e.g., mammals. Suppose further that bacteria are more closely related to plants than to fish, amphibia, and mammals, in that order. If so, we should see evidence of these facts in the sequences of amino acids of common proteins. For example, all the mentioned groups use cytochrome C, a protein used in energy production. The differences in that protein should fit an evolutionary sequence. However, bacterial cytochrome C compared with the corresponding proteins in horse, pigeon, tuna, silkmoth, wheat, and yeast show all of them to be equidistant from the bacterium. The difference from bacterium to yeast is no less than from bacterium to mammal, or to any of the other classes.

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Nor does the picture change if we choose other classes or different proteins. The traditional classes of organisms are identifiable throughout the typological hierarchy, and the relative distances between them remain similar regardless of hypothesized evolutionary sequences. For example, Denton observes that amphibia do not fall between fish and terrestrial vertebrates. Contrary to the orthodox theory, amphibia are the same distance from fish as are reptiles and mammals.[7]

In all comparisons, the hypotheses of general evolution are false. Denton writes:

> The really significant finding that comes to light from comparing the proteins' amino acid sequences is that it is impossible to arrange them in any sort of evolutionary series.[8]

The upshot is that

> the whole concept of evolution collapses[9] [because] the pattern of diversity at a molecular level conforms to a highly ordered hierarchic system. Each class at a molecular level is unique, isolated, and unlinked by intermediates.[10]

Moreover accidental design adjustments, as necessary for general evolution, are logical disasters. Random mutations from radiation, replication errors, or other proposed sources, rarely result in viable design adjustments, never in perfect more advanced designs.

Evidence for general evolution is altogether lacking and predictions from the theory are false. Darwin confessed

> the distinctness of specific forms and their not being blended together by innumerable transitional links is a very obvious difficulty.[11]

Still he insisted on gradual change due to natural selection which he said

> can produce no great or sudden modifications; it can act only by short and slow steps.[12]

More than a century later the fossil record still does not fit Darwinian orthodoxy. Ironically, by admitting this "trade secret of paleontology"[13] Harvard professor Stephen Jay Gould has achieved fame and glory. From Darwin forward, everywhere in the biological hierarchy researchers came to uncrossed chasms. Yet they pretended the gaps did not exist. This set the stage for Gould's saltational theory—an idea Darwin explicitly rejected.

Gould's idea is like the fantasies of Fred Hoyle[14] and Francis Crick[15] about extraterrestrial civilizations. While Gould, along with colleague Niles Eldridge, proposes miraculous sudden leaps in evolutionary progress,[16] Hoyle and Crick, propose panspermia—life seeds from some extraterrestrial civilization. All such theories merely postpone thinking. Denton rejects them and concludes that perfect design implies supreme intelligence. But, unlike Gould, Eldridge, Hoyle, and Crick, he does not reach his own proposal by wild imagination, but by a ruthless application of logic.

He notes that the design problem and its solution find a nearly perfect analogy in the difficulty of generating texts in a language. While the number of possible texts is large, the number of nonsensical strings is larger by orders of infinity. It is an understatement to say that the probability of generating by chance even one grammatical text of just a few hundred

words is vanishingly small. Any such string implies intelligence.

In the same way, viable sequences of life's material are an infinitesimal proportion of possible arrangements. The question is how a viable sequence could arise by accident. Denton considers the odds. He cites Hoyle and Wickramasinghe who estimate the chance of a single living cell spontaneously coming into existence as 1 in $10^{40,000}$ tries—"an outrageously small probability. . .even if the whole universe consisted of organic soup."[17] Referring then to the "elegance and ingenuity of an absolutely transcending quality, which so militates against the idea of chance, ..." he asks:

"Is it really credible that random processes could have constructed a reality, the smallest element of which—a functional protein or gene—is complex beyond. . .anything produced by the intelligence of man?"[18]

In the end, Denton suggests, the advocates of orthodox evolution are like Lewis Carroll's Red Queen. When Alice protested that there's no use trying to believe impossible things, the Queen said:

"I dare say you haven't had much practice. . . . When I was your age I did it for half an hour a day. Why sometimes I've believed as many as six impossible things before breakfast."[19]

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THIS ISSUE

Scientific Creationism and Intelligent Design

by

Wm. A. Dembski

SCIENTIFIC CREATIONISM AND INTELLIGENT DESIGN *by Wm. A. Dembski*

A good portion of this essay derives from the first part of a talk I gave at the State University of New York, Stonybrook, on 21 April 1994 at a symposium sponsored by the Honors College and organized in by Pat Detwiler and Heather Books. The symposium examined the differences between Darwinian Naturalism and Intelligent Design. It was attended by Michael Behe, Paul Nelson, and myself on the design side, and by Elof Carlson, Jeffrey Levinton, and Michael Simon on the Darwin side (the latter three are on the faculty at SUNY). It proved to be a useful forum for clarifying our ideas on design. I want especially to thank Pat Detwiler for his dedication in putting everything together.

What is the difference between scientific creationism and intelligent design? And if there is a difference, is it an important one? The reason I'm devoting this entire issue of *Transactions* to these questions is because I foresee them playing an increasingly prominent role in future debates about life's origin and evolution. The two notions are distinct, and it is in the interest of clear thinking to keep them distinct. For it is precisely by confusing these two notions that I foresee Darwinian naturalists sidestepping valid objections to their evolutionary theories.

Let us therefore start with some definitions. Scientific creationism, or creation science as it is also known, can be epitomized in roughly the following six claims: (1) there was a sudden creation of the universe, energy, and life from nothing; (2) mutations and natural selection are insufficient to bring about the development of all living kinds from a single organism; (3) changes of the originally created kinds of plants and animals occur only within fixed limits; (4) there is a separate ancestry for humans and apes; (5) the earth's geology can be explained via catastrophism, primarily by the occurrence of a worldwide flood; and (6) the earth and living kinds had a relatively recent inception (on the order of ten thousand years).

I've taken this characterization of scientific creationism from Ron Numbers' book *The Creationists*. This is the characterization of scientific creationism used in the 1981 Arkansas creation trial. As is evident, there is no explicit reference to the Bible in any of these six tenets. But as is also evident, these six tenets could not have been devised independently of the Bible. By appending "scientific" to the term "creationism," scientific creationists indicate their intention to make creationism a stand-alone discipline which need not depend on the Bible. Their rationale is to read the Bible, and especially the first few chapters of Genesis as a scientific text, but once whatever science has been extracted from the text, to set it on its own footing without reference to the Bible.

So the crucial question at the Arkansas creation trial was whether these six tenets could serve as the basis for a genuinely scientific discipline. Witnesses against the creationist position, notably Michael Ruse, argued that it could not. Indeed, it was important for the purposes of the trial to show not that scientific creationism was bad science (there is after all no law to keep bad science from being taught in our schools), but rather religion masquerading as science (against which there is a law). Hence the creationist position was charged with being "unscientific," a charge which judge Overton upheld.

Although the Arkansas creation trial was considered a defeat by most creationists, it did result in a striking admission from the philosophy of science community. Those in the community who knew their business (e.g., Larry Laudan and Ernan McMullin)

immediately recognized that a false view of science was being used in the courts to prevent scientific creationism from being accorded the status of a science. It's not that the philosophy of science community had any great love for scientific creationism. As a whole the community thinks it is an ill-conceived enterprise with about the same respectability as phrenology.

The point is, however, that phrenology, though a bad science, nonetheless does constitute a science. Indeed, there is no a priori, logical impossibility that prevents the bumps on our heads from providing profound insights into the human psyche. The problem with phrenology was that these bumps simply weren't all that informative about the human psyche. So too, Larry Laudan would argue that scientific creationism has all the attributes of a scientific theory—it just happens to be a failed scientific theory.

Scientific creationism as described in the six tenets listed above is indeed a scientific theory. Even the notion of a creator, which is present throughout these tenets, does not make scientific creationism "unscientific." A creator can serve as an unobservable theoretical entity posited to explain the origin of the universe and life in much the same way that the natural sciences employ their theoretical entities (e.g., quarks, black holes, and superstrings) to explain their phenomena. Thus Philip Kitcher in his tract against scientific creationism entitled *Abusing Science* makes the following point: "Even postulating an unobserved Creator need be no more unscientific than postulating unobservable particles. What matters is the character of the proposals and the ways in which they are articulated and defended."

Whether scientific creationism is a brilliant theory, whether it is an empirically adequate theory, or even whether it is a falsified theory are questions open for debate. By and large the academic community doesn't take scientific creationism very seriously. Especially problematic to this community are tenets (5) and (6), having to do with a young earth (less than 10,000 years) and a worldwide flood. The precise merits of scientific creationism, however, are not the concern of this essay. Suffice it to say that scientific creationism is a scientific theory that makes certain concrete claims about the world (viz., those listed in tenets (1)-(6) above).

Having examined scientific creationism, I wish next to turn to the notion with which scientific creationism is with increasing frequency being compared, namely, intelligent design (see for instance the recent debate between Eugenie Scott and Stephen Meyer in the 21 February 1994 issue of *Insight*). Like scientific creationism, it is possible to characterize intelligent design in a few particular claims. In fact, two such claims suffice: (1) naturalistic scenarios are insufficient to account for the origin of life and the differences in complexity and organization among living systems; (2) an intelligent cause (= an intelligent designer or simply designer) provides an empirically adequate account of the origin of life and the differences in complexity and organization among living systems. (1) and (2) are flip sides of the same coin. (1) constitutes a critique of any naturalistic scenario that attempts by purely naturalistic means to explain both the origin of living systems and the differences in complexity and organization among them. (2) puts forward a positive program to explain via an intelligent cause what the naturalistic scenarios are perceived as having failed adequately to explain.

From these brief overviews of scientific creationism and intelligent design, what can be said about the relation between the two? The first thing that ought to strike us is that intelligent design is a more modest position than scientific creationism. In saying this, I'm not making a value judgment. Rather, I'm simply pointing out that intelligent design places far fewer demands on our credence than scientific creationism. Scientific creationism describes the origin of the universe, its duration, the mechanisms responsible for geological formations, and the limits to evolutionary change, all the while conforming its account of creation as much as possible to the first chapters of Genesis. In contrast, intelligent design makes no claims about the origin or duration of the universe, is not committed to flood geology, can accommodate a considerable degree of evolutionary change, and does not specify in advance the mode by which the designer brought the first organisms into being. Unlike scientific creationism, intelligent design does not smuggle in a religious creed.

Although our natural inclination is perhaps to side with theories that say more rather than less (in line with the dictum that more is better), nevertheless for apologetic purposes theories that say less are often to be preferred. Suppose theory A says more than theory B. If both A and B are known to be correct, then if we are forced to choose one of them, it is certainly preferable to have A as opposed to B. But if we have our doubts about both A and B, then it is generally safer to stick with B before investing too much in A. The point is this: by saying less, B makes fewer commitments, carries less baggage, and has less chance of going wrong. Solomon's proverb about even the fool being thought wise if he holds his tongue is what's at stake here. The less a scientific theory says, the less likely it is to stick its foot in its mouth.

Although what I've just said is strictly a logical point about the explanatory power of scientific theories, there are also some practical reasons for preferring intelligent design to scientific creationism in Christian apologetics. The most obvious is that because scientific creationism hasn't been scoring very many points in the academic community, it's probably time to put our money on a different horse. There's more to it than expedience, however. Indeed, intelligent design gets at the heart of what hinders the academic community from taking divine agency in the world seriously. Since the last century science has systematically sought to eradicate design/telos/intentionality from the study of nature. It has done this not by argument but by fiat, i.e., science came to be defined as that way of explaining phenomena without recourse to intentionality. And in the best positivist tradition, to this definition was added the conviction that science could without appealing to intentionality explain anything that might ever need explaining. Design was thus rendered a dead letter.

Let me stress that what I'm saying here is not a fanciful reconstruction of

scientific method and practice. Scientists and philosophers have self-consciously set out to divorce any notion of design from science. Jacques Monod will for instance write in *Chance and Necessity* that "the cornerstone of the scientific method is the postulate that nature is objective. In other words, the *systematic* denial that 'true' knowledge can be got at by interpreting phenomena in terms of final causes—that is to say, of 'purpose'." (Final causes, purposes, intentionality, teleology, and design are in this context synonymous.) Why a negative principle like the denial of design should serve as the cornerstone for science is not clear, save as a matter of philosophical prejudice. Certainly no one denies that Aristotle's teleology proved scientifically sterile for understanding the laws governing matter in motion. But to deny design a place in science on a priori grounds cannot but strike one as dubious.

Indeed, the status of design in science can properly be decided only by the fruitfulness and conceptual power which design brings to science. The project to make design into a fruitful scientific theory—one that generates an active research program and provides a powerful alternative to the standard evolutionary models—is currently being undertaken by a highly qualified group of researchers spanning a broad range of disciplines. (For an idea of what's happening here I highly recommend J. P. Moreland's *The Creation Hypothesis*, which appeared this April from InterVarsity Press—yours truly is one of the "highly qualified researchers" with an article in this book.)

In future issues of *Transactions* I'll be saying more about the specifics of this project. Nevertheless, for the remainder of this essay I want to describe several challenges that are regularly directed against intelligent design. The first challenge, and this one goes right back to Darwin's *Origin of Species*, is that "intelligent design" is just a change in terminology, serving as a substitute for "scientific creationism." The reason I say that this challenge goes right back to Darwin is that throughout the *Origin of Species* Darwin opposed his theory to a version of creationism much like what I've characterized above as scientific creationism.

Darwin, and all his modern disciples, who see as the only alternative to their naturalistic evolutionary scenarios something like scientific creationism, are guilty of setting up a straw man. The problem with straw men, however, is that they rarely do a good job of adequately characterizing the opposition or laying out the options. Scientific creationism is a difficult position to defend. A more modest theory like intelligent design, on the other hand, is much easier to defend and much more difficult to defeat. The move then to change terminology and thus equate scientific creationism with intelligent design is therefore a lazy way out of dealing with intelligent design. For the sake of argument, therefore, it is essential to draw the distinction tightly between intelligent design and scientific creationism.

Once the distinction is drawn, however, the fight will hardly be over. The problem is that intelligent design, if it actually does what it purports to do, will give the death blow to all naturalistic scenarios for the origin and speciation of life. Far too much is riding on naturalism in the academic community for intelligent design therefore to be left unchallenged. As Napoleon III once shrewdly observed, "one never really destroys a thing till one has replaced it." Intelligent design threatens to destroy Darwinism—really destroy Darwinism—in precisely this way, namely, by replacing it.

The next challenge is that intelligent design threatens to introduce the supernatural into science. Since science is by definition supposed to be confined to naturalistic explanations, design must therefore be excluded from science out of hand. This challenge goes by the name of "methodological naturalism"—that science must by definition be naturalistic and therefore that intelligent design must automatically be excluded from science. Eugenie Scott, an apologist for the Darwinian cause, puts the matter this way: "You can't (scientifically) study variables you can't test directly or indirectly. You can't use supernatural explanation because you can't put an omnipotent deity in a test tube (or keep it out of one). As soon as creationists invent a 'theo-meter' maybe then we can test for miraculous intervention."

This challenge misses a fundamental point: though science seeks to explain what happens in nature, the theoretical entities it invokes in these explanations need not themselves be naturalistic. This point is crucial. The business of science is to explain phenomena—the stuff that happens in space and time, and is perceptible to our senses. In this respect phenomena are purely naturalistic. Phenomena, to use Scott's expression, can be put into a test tube, although when we're talking about stars and galaxies, we're talking about some awfully big test-tubes. All the same, it makes no sense to say that the explanations of phenomena need be naturalistic. Naturalistic explanation is an oxymoron. The fields, potentials, quarks, and strings of theoretical physicists are not in any clear sense naturalistic. They are theoretical constructs for understanding the things we observe in nature, but they themselves have no clear reference in nature.

The next challenge involves trying to assimilate intelligent design to either apparent or optimal design. Using the word "intelligent" to modify the word "design" in the phrase "intelligent design" is not redundant. Intelligent design needs to be distinguished from apparent design on the one hand, and optimal design on the other. Apparent design is something that looks designed, but really isn't. Optimal design is something that is perfectly designed, and thus exists at best in a Platonic heaven.

Now a common strategy of scientists like Stephen Jay Gould and Richard Dawkins is to try to assimilate intelligent design to one of these categories. This move is illicit. The automobiles that roll off the assembly plants in Detroit are intelligently designed in the sense that human intelligences are responsible for them. Yet by no stretch of the imagination are they optimally designed. Nor is it fair to say that they are only apparently designed.

There is therefore a difference between intelligent, apparent, and optimal design. Intelligent design holds that an intelligent cause explains the origin and complexity of life. Yet it refuses to make any further assumptions about the nature of this cause. In particular, an intelligent cause need have none of the perfections associated with the creator

God of Judaism, Christianity, or Islam. Whereas optimal design demands an overly precise designer who has to get everything just right, intelligent design fits our ordinary experience of design, which is always conditioned by the needs of a situation and is therefore always less than optimal. I suppose an optimal coat hanger would be one made of titanium and machined to minute tolerances on the order of a micron. Optimality of this sort, however, is gratuitous. The point I wish to stress is that intelligent design smuggles in none of the a priori assumptions about the nature of the designer that seem to be the stock-in-trade of scientific creationism on the one hand, and atheistic evolutionism on the other.

The final challenge to intelligent design I want to clear up is that holding to design in biology commits one to a god-of-the-gaps fallacy. The god-of-the-gaps fallacy is a legitimate concern to scientists since it involves a violation of the integrity of nature. When we look at a causal chain in nature and are unable to discover one of its links, the god-of-the-gaps fallacy invokes God to serve as the missing link. God thus becomes a supernatural link between natural causes until such time that a suitable natural cause is found to replace it. In this way god-of-the-gaps violates the integrity of the causal nexus of nature.

All the same, the worry that design is inextricably bound up with a god-of-the-gaps fallacy is wholly unfounded. Design, and intentionality more generally, is fully compatible with the integrity of nature. Plato realized as much over 2000 years ago. In the *Phaedo* [98d-99a] Plato has his hero Socrates make the following observation:

> If [one] tried to account ... for my conversing with you, adducing causes such as sound and air and hearing and a thousand others, and never troubled to mention the real reasons, which are that since Athens has thought it better to condemn me, therefore I for my part have thought it better to sit here, and more right to stay and submit to whatever penalty she orders. Because, by dog, I fancy that these sinews and bones would have been in the neighborhood of Megara or Bœotia long ago—impelled by a conviction of what is best!—if I did not think that it was more right and honorable to submit to whatever penalty my country orders rather than take to my heels and run away. But to call such things like that causes is too absurd.

Why is Socrates sitting around in prison, conversing with his friends, and awaiting death by hemlock? According to Plato the answer is to be found in Socrates' intention to submit to the judgment rendered by the Athenian courts. Socrates' intention explains his actions. Now the thing to note is that this intentional explanation is fully compatible with, as Socrates put it, "adducing causes such as sound and air and hearing and a thousand others"—that is to say, with the natural causes of science. Intentionality in general, and design in particular, involves no break with the causal nexus of nature. Design complements rather than violates nature.

I hope these observations about design have proved helpful. In the creation-evolution debate it is important that we define our terms carefully and stake out our positions forcefully.

Age of the cosmos

"How old is the universe?" U.S. News & World Report, *May 20, 1996. Pages 60-62.*

One of the most basic questions astronomers attempt to answer is how fast the universe is expanding. That answer is the key to unlocking various other secrets, such as how old the universe is. Using data obtained from the Hubble Space Telescope, two teams of scientists have been hammering away at that question for over two years. Their preliminary results, however, are light years apart.

One team says the expansion rate is such that the universe could barely be nine to 12 billion years old, whereas the other group thinks 12 to 15 billion is a more accurate age figure. Some years ago Edwin Hubble, for whom the telescope is named, initially pegged the age of the universe at only two billion years, which is, as geologists pointed out at the time, a lot younger than some of the earth's rock formations. ☺

A series of 17 questions regarding religious beliefs were given to 1512 random U.S. households. Despite the fact that several questions were written in a way in which there were no good answers among the choices, the poll basically confirmed the fact that Americans are a religious people who believe in a personal Creator/God.

Nearly 9 out of 10 (88.6%) agreed that "there is a personal God who answers prayer." Almost as many agreed that "miracles are performed by the power of God." Of the 92.1% who expressed a "current belief in God," 6.1% had become believers in the past. Only 6.0% "do not believe in God" at all. On another question, about 86% indentified themselves as either "very religious" or "somewhat religious."

Four of the questions dealt with creation/evolution. Only 39% of respondents agreed that "evolution is the best possible explanation of human existence," while 46.4% disagreed. We can assume that "evolution" includes theistic and naturalistic evolution. To the question "God created the cosmos about 5,000 to 10,000 years ago," only 19.1% indicated they agreed, but to a creationist, these questions would have seemed vague.

As the questions were discussed, two trends appeared. Both younger and more highly educated individuals seemed to accept a fully secular position more than their elders. Evidently the aggressive naturalistic flavor of education is paying off for the secularists.

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THIS ISSUE

What Every Theologian Should Know about Creation, Evolution, and Design

by

William. A. Dembski

WHAT EVERY THEOLOGIAN SHOULD KNOW ABOUT CREATION, EVOLUTION, AND DESIGN *by William. A. Dembski*

This article is a somewhat revised version of a lecture given at the Princeton Apologetics Seminar in April of this year. The Princeton Apologetics Seminar has been organized by a group of students at Princeton Theological Seminary known as the Charles Hodge Society. The Princeton Apologetics Seminar meets weekly, and provides a forum for students to study Christian apologetics systematically through lectures, debates, and vigorous discussion.

Introduction

From its inception Darwinism posed a challenge to Christian theology. Darwinism threatened to undo the Church's understanding of creation, and therewith her understanding of the origin of human life. Nor did the challenge of Darwinism stop here. With human beings the result of a brutal, competitive process that systematically rooted out the weak and favored only the strong (we might say it is the strong who constitute the elect within Darwinism), the Church's understanding of the fall, redemption, the nature of morality, the veracity of the Scriptures, and the ultimate end of humankind were all in a fundamental way called into question. Without exaggeration, no aspect of theology escaped the need for re-evaluation in the light of Darwinism.

Well, a lot has happened since the publication of Darwin's *Origin of Species*. Theology that is academically respectable has long since made its peace with Darwinism. Indeed, respectable theologians have long since had their understanding of the origin of life thoroughly informed by Darwinism and its interpretation of natural history. Thus when a group of Christian scholars who call themselves *design theorists* begin to raise doubts about Darwinism and propose an alternative paradigm for understanding biological systems, it is the design theorists, and not Darwin, who end up posing the challenge to theology.

As a card-carrying design theorist, I want in this talk to examine the challenge that design poses to the contemporary theologian. What continues to intrigue me is that the group of academicians design theorists have the hardest time engaging is not the secular scientists, but theologians and cross-disciplinary scientists whose cross-discipline happens to be theology (e.g., Nancey Murphy and Howard van Till). Why is this? The short answer is that mainstream theologians perceive design theorists as theological greenhorns who unfortunately have yet to fathom the proper relation between theology and science. Of course, design theorists think it is rather the mainstream theologians who have failed to grasp the proper relation between theology and science.

It is ironic that the design theorists have received an even cooler reception from the theological community than from the Darwinist establishment (which not surprisingly isn't well-disposed toward the design theorists either). Yes, a notable design theorist did speak here at Princeton Seminary last spring, namely, Phillip Johnson. But his talk was ill-attended (in marked contrast to

the large audiences he attracts at secular universities), with as far as I can recall only one faculty member from this institution in attendance.

Because the design theorists' approach to biological systems is so ill-appreciated within the theological community, my aim in this talk is to make the design theorists' critique of Darwinism intelligible, and I hope even compelling, to the contemporary theologian. In particular, I wish to show that the design theorists' critique constitutes a genuine challenge for contemporary theology, and is not rightly dismissed by a one-liners like, "Design commits the god-of-the-gaps fallacy" or "Design violates the rules of science."

To make the design theorists' critique of Darwinism intelligible to the theological community, I shall need to outline their critique as they direct it first against the Darwinist establishment. Once we understand the design theorists' dialogue with this group, it will be easier to understand the challenge their critique poses to the theological community. Before taking up these tasks, however, I wish to indicate where design fits into the creation-evolution controversy generally.

Setting the Stage

Because it is all too easy to dismiss a position without genuinely understanding it, I want to begin by dispensing with a few labels and stereotypes. First off, design is not young earth creationism. This is not to say that there are no young earth creationists who are also design theorists (Paul Nelson and Siegfried Scherer come to mind). But for the sake of argument design theorists are willing tacitly to accept the standard scientific dates for the origin of the earth and the origin of the universe (i.e., 4-5 billion years for the earth, 10-20 billion years for the universe), and reason from there. The point is that design theory does not stand or fall with what age one assigns to the universe.

Next, the design theorists' critique of Darwinism in no way hinges on the Genesis account of creation. On no occasion do design theorists invoke Genesis 1 and 2 as a scientific text, trying to conform natural history to the Genesis account of creation or vice versa. Design as a theory holds to neither a day-age, nor a gap, nor an apparent age interpretation of Genesis. Thus it is illegitimate to characterize design theorists as old-earth creationists (though there are old-earth creationists who are design theorists, notably Stephen Meyer and Robert Newman). Old-earth creationism holds that Genesis, modulo some exegetical maneuvering, can accurately accommodate natural history. Whether one approaches Genesis in this way is simply irrelevant to design theory.

Nor can it be said that design theory endorses progressive creation. Progressive creation holds that God intervened at various points in natural history, creating new kinds, as it were, from scratch. Progressive creation can accommodate a considerable degree of evolutionary change once a given kind is in place. According to this view the creation of a given kind induces an evolutionary envelope within which considerable, but not unlimited, variation is possible. For instance, we might imagine God creating an initial pair of dogs, and all subsequent dogs being related to this initial pair by common descent—everything from a St. Bernard to a Chihuahua. Nevertheless, the progressive creationist would be uninclined to view dogs and amoeba as sharing the same genealogical tree.

Nor can design theory strictly speaking be said to be anti-evolutionist. This may sound surprising, especially since design theorists tend to dislike the term "evolution," viewing it as a weasel word that serves more to obfuscate than clarify. The reason design theorists dislike the word is not because they repudiate every possible construal of it, but because they regard it as a Protean term which, much like the process it describes, adapts itself too readily to any situation. Although design theorists regard the word "evolution" as assuming too many distinct meanings that are too easily confused, the notion that organisms have changed over time hardly upsets them. Design theory places no limits on the amount of evolutionary change that organisms might have experienced in the course of natural history. Consistent with classical views of creation, design allows for the abrupt emergence of new forms of life. At the same time design is also consistent with the gradual formation of new forms of life from old.

The design theorists' beef is not with evolutionary change *per se*, but with the claim by Darwinists that all such change is driven by purely naturalistic processes which are devoid of purpose. Design theorists therefore agree completely with the following statement by the historian of science Stanley Jaki:

> As to the claim ... that the Darwinian evolutionary mechanism (the interplay of chance mutations with environmental pressure) has solved all basic problems, I hold it to be absurd and bordering at times on the unconscionable. While the mechanism in question provoked much interesting scientific research, it left unanswered the question of transition among genera, families, orders, classes, and phyla where the absence of transitional forms is as near-complete as ever. As to the origin of life and especially of consciousness, they are today no less irreducible to physics than they were in Darwin's time.

Though design theorists believe Darwinism is dead wrong, unlike the creationist movement of the 1980's, they do not try to win a place for their views by taking to the courts. Instead of pressing their case by lobbying for fair treatment acts in state legislatures (i.e., acts that oblige public schools in a given state to teach both creation and evolution in their science curricula), design theorists are much more concerned with bringing about an intellectual revolution starting from the top down. Their method is debate and persuasion. They aim to convince the

intellectual elite and let the school curricula take care of themselves. By adopting this approach design theorists have enjoyed far more success in getting across their views than their creationist counterparts.

Phillip Johnson, for instance, has debated some of the brightest stars in the scientific galaxy (including Nobel laureate Steven Weinberg). However much the Darwinian establishment would like to ignore him, they simply cannot. This is not to say that the Darwinian establishment is particularly well-disposed toward Johnson. But Johnson and his fellow design theorists have gained a grudging respect from at least some quarters of the Darwinian establishment. Thus when the arch-Darwinist Michael Ruse wants to give the other side a chance in his journal *Biology and Philosophy*, he comes to us. I cannot imagine Ruse making a similar offer to the creationists who opposed him at the Arkansas creation trial.

From all that I've just said, it's hard to imagine how design theorists could be identified as narrow fundamentalists. There is nothing in design theory that requires a narrow hermeneutic for interpreting scripture. Indeed, design theory makes neither an explicit nor an implicit appeal to scripture. Nonetheless, design theorists are frequently accused of being, if not fundamentalists, then crypto-fundamentalists. What lies behind this tendency to lump them with fundamentalism as opposed to placing them squarely within the mainstream of American evangelicalism? The answer to this question is quite simple: *Design theorists are no friends of theistic evolution.* As far as design theorists are concerned, theistic evolution is American evangelicalism's ill-conceived accommodation to Darwinism. What theistic evolution does is take the Darwinian picture of the biological world and baptize it, identifying this picture with the way God created life. When boiled down to its scientific content, theistic evolution is no different from atheistic evolution, accepting as it does only purposeless, naturalistic, material processes for the origin and development of life.

As far as design theorists are concerned, theistic evolution is an oxymoron, something like "purposeful purposelessness." If God purposely created life through the means proposed by Darwin, then God's purpose was to make it seem as though life was created without any purpose. According to the Darwinian picture, the natural world provides no clue that a purposeful God created life. For all we can tell, our appearance on planet earth is an accident. If it were all to happen again, we wouldn't be here. No, the heavens do not declare the glory of God, and no, God's invisible attributes are not clearly seen from God's creation. This is the upshot of theistic evolution as the design theorists construe it.

Design theorists find the "theism" in theistic evolution superfluous. Theistic evolution at best includes God as an unnecessary rider in an otherwise purely naturalistic account of life. As such, theistic evolution violates Occam's razor. Occam's razor is a regulative principle for how scientists are supposed to do their science. According to this principle, superfluous entities are to be rigorously excised from science. Thus, since God is an unnecessary rider in our understanding of the natural world, theistic evolution ought to dispense with all talk of God outright and get rid of the useless adjective "theistic."

It's for failing to take Occam's razor seriously that the Darwinist establishment despises (yes I say despises) theistic evolution. They view theistic evolution as a weak-kneed sycophant, who desperately wants the respectability that comes with being a full-blooded Darwinist, but refuses to follow the logic of Darwinism through to the end. It takes courage to give up the comforting belief that life on earth has a purpose. It takes courage to live without the consolation of an afterlife. Theistic evolutionists lack the stomach to face the ultimate meaninglessness of life, and it is this failure of courage that makes them contemptible in the eyes of full-blooded Darwinists (Richard Dawkins is a case in point).

Unlike full-blooded Darwinists, however, the design theorists' preoccupation with theistic evolution rests not with what the term "theistic" is doing in the phrase "theistic evolution," but rather with what the term "evolution" is doing there. The design theorists' objection to theistic evolution is not in the end that theistic evolution retains God as an unnecessary rider in an otherwise perfectly acceptable scientific theory of life's origins. Rather, the design theorists' objection is that the scientific theory which is supposed to undergird theistic evolution, usually called the neo-Darwinian synthesis, is itself problematic.

The design theorists' critique of Darwinism begins with Darwinism's failure as an empirically adequate scientific theory, and not with its supposed incompatibility with some system of religious belief. This point is vital to keep in mind in assessing the design theorists' contribution to the creation-evolution controversy. Critiques of Darwinism by creationists have typically conflated science and theology. Design theorists will have none of this. Their critique of Darwinism is not based on any supposed incompatibility between Christian theism and Darwinism. Rather, they begin their critique by arguing that Darwinism is *on its own terms* a failed scientific paradigm—that it does not constitute a well-supported scientific theory, that it's explanatory power is severely limited, and that it fails abysmally when it tries to account for the grand sweep of natural history.

Michael Denton's critique of Darwinism is a case in point. In his book *Evolution: A Theory in Crisis*, Denton argues at length that the neo-Darwinian synthesis is a failed scientific paradigm. It bears noting that Denton is an agnostic in matters of religious faith—thus in criticizing Darwinism he has no religious ax to grind. The

problems facing Darwinism are there, and they are glaring: the origin of life, the origin of the genetic code, the origin of multicellular life, the origin of sexuality, the gaps in the fossil record, the biological big bang that occurred in the Cambrian era, the development of complex organ systems, and the development of irreducibly complex molecular machines are just a few of the more serious difficulties that confront every theory of evolution that posits only purposeless, material processes.

As a post-doctoral instructor in philosophy of science at Northwestern University I taught an undergraduate course on the creation-evolution controversy. I began this course by having my students read Peter Bowler's *Evolution: The History of an Idea* (a generally sympathetic historical account of the concept of evolution as it plays itself out from ancient times to the present-day), and followed it with Michael Denton's *Evolution: A Theory in Crisis*. Within three weeks no one in the class thought that the fundamental claim of Darwinism, namely common descent through selection and modification, was self-evident or particularly well supported.

Nor would anyone in my class have agreed with Richard Dawkins that to deny this central thesis of Darwinism one has to be either *stupid* or *wicked* or *insane*. No, one can be reasonably well-adjusted, remarkably well-educated (as many design theorists are), and still think Darwinism is a failed scientific paradigm. Let me stress that my students represented quite a cross section of opinion. I had two or three who were conservative Christians actively involved in Campus Crusade. I also had a few who were staunch Darwinists and came to love Richard Dawkins when later in the term we read Dawkins' book *The Blind Watchmaker*. Yet none of my students left the course thinking that the debate over Darwinism was like arguing over whether the earth is flat. Wherever they stood, they realized there were serious difficulties which needed to be resolved. In short, they realized that there is a genuine critique of intellectual merit against Darwinism.

The strength of the design theorists' critique against Darwinism, however, rests not in the end in their ability to find holes in the theory. To be sure, the holes are there and they create serious difficulties for the theory. The point, however, at which the design theorists' critique becomes interesting and novel is when they begin raising the following sorts of questions: Why does Darwinism, despite being so inadequately supported as a scientific theory, continue to garner the full support of the academic establishment? What is it that continues to keep Darwinism afloat despite its many glaring faults? Why are alternative paradigms that introduce design or teleology ruled out of court by fiat? Why must science explain solely by recourse to naturalistic, materialistic, purposeless processes? Who determines the rules of science? Is there a code of scientific correctness which instead of helping to lead us into truth actively prevents us from asking certain questions and thereby coming to the truth?

These questions are not merely hypothetical. Dean Kenyon, a fellow design theorist, is professor of biology at San Francisco State University. In one of his introductory biology courses Kenyon presented the standard neo-Darwinian theory and then pointed to some difficulties in it, stating that he himself holds to a design hypothesis. Mind you, Dean Kenyon is not a rube or ignoramus. Kenyon received his Ph.D. in biophysics from Stanford University. In the late 60's he himself firmly held to the neo-Darwinian synthesis, even writing a seminal book on the topic of prebiotic evolution. The book was entitled *Biochemical Predestination*. Yet by the late 70's he began to entertain doubts about his views. When he changed his position, not for religious but for scientific reasons, he found that research moneys dried up and that a not-so-subtle persecution had began.

Thus when not so long ago Kenyon explained his views on design to his introductory biology course, his department used this as a pretext to remove him from teaching introductory biology and to relegate him to supervising lab experiments—this even though he was a senior faculty member. Every review committee confirmed that Kenyon's department had violated his academic freedom. It took three meetings of successively more weighty academic review committees at his institution to lean on the biology department sufficiently to reinstate Kenyon's right to teach introductory biology, and this only after another design theorist, Stephen Meyer, wrote an op-ed piece for the *Wall Street Journal* detailing Kenyon's treatment at the hands of his department.

To reiterate, What keeps Darwinism alive? Why is it so difficult to debate its merits fairly? In so pluralistic a society as ours, why don't alternative views about life's origin and development have a legitimate place in academic discourse? It's not enough to say that the young earth creationists have left too bad a taste in the mouth of the academic world about creationism. For Dean Kenyon has never been associated with the young earth creationists. Indeed, he has always been a full-fledged member of the scientific establishment.

When Stephen J. Gould, the dean of American evolutionists, wrote a scathing review of Phillip Johnson's book *Darwin on Trial* for *Scientific American*, why did *Scientific American* refuse to print Johnson's response to Gould's review? Does it serve the furtherance of academic discourse for *Nature*, the premier science periodical of Great Britain, to contact David Hull, a philosopher of biology at Northwestern University, and ask him point blank to write a negative review of Johnson's book, as it were commissioning Hull to do a hatchet job (I have this story from David Hull's own lips)?

I myself have written on aspects of the evolution-creation controversy. When I went on the job market in philosophy a few years back, I was urged to delete some of my published work

from my Curriculum Vitae because, and this is a verbatim quote from the placement officer at my department, "all the analytic philosophers are atheists and they don't want to see that." Most of us who work in the creation-evolution debate have long since discarded the notion that there is anything like academic freedom in this affair, nor do we delude ourselves with the thought that a critique of evolutionary biology will be heard simply because of its inherent intellectual merit. It's unfortunate, but warfare is all too often the most appropriate metaphor for describing this debate.

Clearly something more than an honest concern for responsible scientific inquiry is at stake when individuals of Dean Kenyon's caliber are prevented from even so much as expressing doubts about a scientific theory, especially when they are acknowledged experts in the field. We are dealing here with something more than a straightforward determination of scientific facts or confirmation of scientific theories. Rather, we are dealing with competing world views and incompatible metaphysical systems. With the creation-evolution controversy we are dealing with a naturalistic metaphysic that shapes and controls what theories of biological origins are permitted on the playing field in advance of any discussion or weighing of evidence. This metaphysic is so pervasive and powerful that it not only rules alternative views out of court, but it cannot even permit itself to be criticized. The fallibilism and tentativeness that are supposed to be part and parcel of science find no place in the naturalistic metaphysic that undergirds Darwinism. It is this metaphysic, then, that constitutes the main target of the design theorists' critique of Darwinism, and to which we turn next.

"Creation" and "Evolution"

The design theorists' critique of the naturalistic metaphysic that undergirds Darwinism can be reduced to an analysis of three words. The three words are *creation*, *evolution*, and *science*. Let us start with the words "creation" and "evolution." Suppose you are up on a witness stand and required to respond yes or no to two questions (if you refuse to answer yes or no, you will be taken out and summarily shot). The questions are these: (1) Do you believe in creation? (2) Do you believe in evolution? Could you respond to these questions with a simple yes or no, and still feel satisfied that you had expressed yourself accurately. Probably not. The problem is that the words "creation" and "evolution" both have multiple senses.

For instance, creation can be construed in the narrow sense of a literal six day creation as presented in Genesis 1 and 2. On the other hand, creation can also be construed in the broad sense of simply asserting that God has created the world with a purpose in mind, where the question of how God created the world is simply set to one side. Similarly, evolution can be construed as a fully naturalistic, purposeless process which by means of natural selection and mutation has produced all living things. On the other hand, evolution can mean nothing more than that organisms have changed over time.

Depending on how one construes the words "creation" and "evolution," one's answer to the question *Do you believe in creation?* and *Do you believe in evolution?* are likely to show quite a bit of variability. For myself, Yes, I believe that God created the world with a purpose in mind. And No, I don't believe in fully naturalistic evolution controlled solely by purposeless material processes, and Yes, I do believe that organisms have undergone some change in the course of natural history (though I believe that this change has occurred within strict limits and that human beings were specially created).

Now it is the design theorists' contention that the Darwinian establishment, in order to maintain its political, cultural, and intellectual authority, consistently engages in a fallacy of equivocation when it uses the terms "creation" and "evolution." The fallacy of equivocation is the fallacy of speaking out of both sides of your mouth. It is the deliberate confusing of two senses of a term, using the sense that's convenient to promote one's agenda. For instance, when Michael Ruse in one of his defenses of Darwinism writes, "Evolution is Fact, Fact, Fact!" how is he using the term "evolution"? Is it a fact that organisms have changed over time? There is plenty of evidence that appears to confirm that this is the case. Is it a fact that the panoply of life has evolved through purposeless naturalistic processes? This might be a fact, but whether it is a fact is very much open to debate.

Suppose you don't buy the Darwinian picture of natural history, that is, you don't believe that the vast panoply of life evolved through purposeless naturalistic processes. Presumably then you are a creationist. But does this make you a young earth creationist? Ever since Darwin's *Origin of Species* Darwinists have cast the debate in these terms: either you're with us, or you're a creationist, by which they mean a young earth creationist. Darwin made this move in his *Origin of Species*. Philip Kitcher makes this move in his book *Abusing Science* (publication date 1982). When I debated scientists from the faculty of SUNY Stonybrook last April, they refuted not my actual position, but a caricature which they preferred to attribute to me. It is amazing what you can refute when you deliberately refuse to understand something.

But to return to the point at hand, of course it doesn't follow, logically or otherwise, that by rejecting fully naturalistic evolution you automatically embrace a particular reading of Genesis 1 and 2. Rejecting fully naturalistic evolution does not entail accepting young earth creationism. The only thing one can say for certain is that to reject fully naturalistic evolution is to accept some form of creationism broadly construed, i.e., the belief that God or

some intelligent agent has produced life with a purpose in mind. Young earth creationism certainly falls under such a broad construal of creationism, but is hardly coextensive with creationism in this broad sense.

Let us now assume we've gotten our terms straight. No more terminological confusions. No more fallacies of equivocation. No more straw men. From here on in we're going to concentrate on the essence of the creation-evolution debate. Henceforth this debate will be over whether life exhibits nothing more than the outcome of fully naturalistic purposeless material processes, or whether life exhibits the purposeful activity of an intelligent agent—usually called a designer—who in creating life has impressed on it the clear marks of intelligence. Phillip Johnson has dubbed the first view the Blind Watchmaker Thesis—BWT. We'll call the second view the Intelligent Design Thesis—IDT. BWT and IDT are mutually exclusive and exhaust all possibilities. According to Johnson the key problem to be resolved in the creation-evolution controversy is deciding which of these theses is correct, BWT or IDT. How then shall we reach a decision?

The first thing to notice is that BWT and IDT both make definite assertions of fact. To see this, let's get personal. Here you are. You had parents. They in turn had parents. They too had parents. And so on and so on. If we run the video camera back in time, generation upon generation, what do we see? Do we see a continuous chain of natural causes which go from apes to small furry mammals to reptiles to slugs to slime molds to blue green algae, and finally all the way back to a pre-biotic soup, with no event in the chain ever signaling the activity of an intelligent agent? Or as we trace back the genealogy do we find events that clearly signal the activity of an intelligent agent?

There is a legitimate distinction here. Whole branches of science presuppose that features of the world can display unequivocal marks of intelligence and thereby clearly signal the activity of an intelligent agent (e.g., anthropology, archeology, and forensic science). Nor need the intelligences inferred in this way necessarily all be human or even earthbound (consider, for instance, NASA's Search for Extra-Terrestrial Intelligence program—SETI for short—in which certain radio signals from outer space would with full confidence be interpreted as signaling the presence of an extra-terrestrial intelligence). There are reliable criteria for inferring the activity of an intelligent agent. Does natural history display clear marks of intelligence and thereby warrant such a design inference, or does it not? To answer this question one way is to come down on the side of IDT, to answer it the other way is to come down on the side of BWT.

Now Darwinists are very clear in asserting that natural history does not underwrite a design inference. They are quite explicit in affirming that BWT is correct and in rejecting IDT as incorrect. George Gaylord Simpson, one of the founders of the neo-Darwinian synthesis, in his book *The Meaning of Evolution* leaves us with no doubts about the matter:

> Although many details remain to be worked out, it is already evident that all the objective phenomena of the history of life can be explained by purely naturalistic or, in a proper sense of the sometimes abused word, materialistic factors. They [that is, the objective phenomena of the history of life] are readily explicable on the basis of differential reproduction in populations [that's natural selection], and the mainly random interplay of the known processes of heredity [that's random mutation, the other major element in the Darwinian picture]. Therefore, man is the result of a purposeless and natural process that did not have him in mind.

But Phillip Johnson, Michael Denton, Hubert Yockey, Lecomte du Noüy, Freddy Hoyle, and even Francis Crick have all shown glaring weaknesses in the very theory to which Simpson is referring. Where then does Simpson get his confidence that BWT is right and IDT is wrong? How can Simpson so easily elide the glaring weaknesses in his theory, and then with perfect equanimity assert "it is already evident that all the objective phenomena of the history of life can be explained by purely naturalistic factors"? And how does Simpson know that when the "many details that remain to be worked out" actually do get worked out, that they won't overthrow BWT and instead confirm IDT? Science is after all a fallible enterprise. Whence does Simpson derive such certainty?

"Science"

To answer this question we need to examine how the third word in our trio gets employed by the Darwinist establishment, namely, the word "science." Although design theorists take the question *Which is correct, BWT or IDT?* as a perfectly legitimate question concerning certain facts of the natural world, it is not treated as a legitimate question by the Darwinist establishment. According to the Darwinist establishment BWT poses a "scientific" question whereas IDT poses a "religious" question. Thus, as far as the Darwinist establishment is concerned, IDT is a non-starter. Yes BWT and IDT taken together may be mutually exclusive and exhaustive, but BWT is the only viable scientific option. IDT must therefore be ruled out of court from the start.

Why is this? The answer is really quite simple. Science according to the Darwinist establishment by definition excludes everything except the material and the natural. It follows that all talk of purpose, design, and intelligence is barred entry from the start. To see that I am not making this up one has only to consider the following remark by the author of *Chance and Necessity*, Jacques Monod:

> The cornerstone of the scientific method is the postulate that nature is objective. In other words, the *systematic* denial that "true"

> knowledge can be got at by interpreting phenomena in terms of final causes—that is to say, of "purpose."

Of course, the only way even to begin to justify a negative principle like this is to argue that science has uniformly failed to make headway when it has employed the notion of an intelligent or purposeful cause. And even this sort of argument cannot preclude the possibility that for all its past failures, a concept may yet prove useful in the future.

But back to the point at hand. By defining science as that form of inquiry restricted solely to what can be explained in terms of naturalistic, purposeless, material processes, the Darwinist establishment has ruled IDT out of science from the start. But suppose now that a design theorist comes along, and like most Americans thinks IDT is correct and BWT is incorrect. (According to a Gallop poll close to 50% of Americans are creationists of a stricter sort, thinking that God specially created human beings; another 40% believe in some form of God-guided evolution; and only 9% are full-blooded Darwinists. It's this 9%, however, that controls the academy.) The design theorist's first inclination might be to say, "No big deal. IDT is at least as good an answer to the origins question in biology as BWT. Science just happens to be limited in the questions it can pose and the answers it can give." Fortunately, design theorists are not so naive.

The problem is this. As Phillip Johnson has rightly observed, science is the only universally valid form of knowledge within our culture. This not to say that scientific knowledge is true or infallible. But within our culture, whatever is purportedly the best scientific account of a given phenomenon demands our immediate and unconditional assent. This is regarded as a matter of intellectual honesty. Thus to consciously resist what is currently the best scientific theory in a given area is, in the words of Richard Dawkins, to be either stupid, wicked, or insane. Thankfully, Richard Dawkins is more explicit than most of his colleagues in making this point, and therefore does us the service of not papering over the contempt with which the scientific community regards anyone who questions scientific assertions for other than scientific reasons (theological reasons being of course the worst offender here).

It bears repeating: the only universally valid form of knowledge within our culture is science. Within late 20th century western society neither religion, nor philosophy, nor literature, nor music, nor art makes any such cognitive claim. Religion in particular is seen as making no universal claims that are obligatory across the board. The contrast with science is here blaring. Science has given us technology—computers that work as much here as they do in the third world. Science has cured our diseases. Whether we are black, red, yellow, or white, the same antibiotics cure the same infections. It's therefore clear why relegating IDT to any realm other than science (e.g., religion) ensures that BWT will remain the only intellectually respectable option for the explanation of life.

But something isn't quite right here. IDT and BWT both inquire into definite matters of fact. If each of the cells that make up living things were to have emblazoned on them in clear script the phrase "made by Yahweh," there would be no question that IDT is correct and BWT is incorrect. Don't let the science-fiction character of this example distract you. The point is that IDT and BWT are both real possibilities so long as one doesn't impose any a priori conditions that restrict in advance what can count as a viable option in the explanation of life. Granted, cells don't have emblazoned on them the phrase "made by Yahweh." But we wouldn't know this unless we actually looked at cells under the microscope.

It's here that we come to the heart of the design theorists' critique of Darwinism. Logically, BWT and IDT are real possibilities. What's more, as mutually exclusive and exhaustive possibilities, one of these theses has to be correct (I'm sorry, but at this level of discourse the law of the excluded middle definitely holds). The Darwinist establishment has so defined science that BWT alone can constitute an appropriate scientific answer to the question *How did life originate and develop?* Nevertheless, when Stephen J. Gould, Michael Ruse, Richard Dawkins, George Gaylord Simpson, and their many disciples assert the truth of BWT, they purport that BWT is the conclusion of a scientific argument based on empirical evidence. But of course it is nothing of the sort. The empirical evidence is in fact weak, and the conclusion follows necessarily as a strict logical deduction once science is as a matter of definition restricted to purposeless, naturalistic, material processes. BWT is therefore built into the very premises with which we started. It is a winner by default.

Logicians have names for this—circular reasoning and begging the question being among them. The view that science must be restricted solely to purposeless, naturalistic, material processes also has a name. It's called *methodological naturalism*. So long as methodological naturalism sets the ground rules for how the game of science is to be played, IDT has no chance Hades. Phillip Johnson makes this point eloquently. So does Alvin Plantinga. In his work on methodological naturalism Plantinga remarks that if one accepts methodological naturalism, then Darwinism is the only game in town.

Okay, since BWT is so poorly supported empirically and since the scientific community is telling us that IDT isn't science, what's wrong with a simple profession of ignorance? In response to the question *How did life originate and develop?* what's wrong with simply saying *We don't know*? (Such a profession of ignorance, by the way, was the reason Michael Denton's book *Evolution: A Theory in Crisis* was panned by the Darwinist establishment.) As philosophers of science Thomas Kuhn and Larry Laudan have pointed

out, for scientific paradigms to shift, there has to be a new paradigm in place ready to be shifted into. You can't shift into a vacuum. Napoleon III put it this way: "One never really destroys a thing till one has replaced it." If you're going to reject a reigning paradigm, you have to have a new improved paradigm with which to replace it. BWT is the reigning paradigm. But what alternative is there to BWT? Logically, the only alternative is IDT. But IDT isn't part of science. This is a case of Hobson's choice. There's no pleading ignorance and no shifting away because BWT is the only game in town.

Note that I'm not saying BWT is a tautology. The tautology criticism has been a long-standing criticism offered against Darwinism. Accordingly, Darwinism is tautologous because it asserts the survival of the fittest, but then turns around and identifies the fittest with those who survive. This sort of tautology is not what we've been talking about here. BWT has genuine content. It sets definite limits on the type of world we inhabit. BWT is not true simply as a matter of linguistic convention. The problem is that BWT purports to be the conclusion of a scientific argument based on empirical evidence, but is actually a strict logical consequence of a prior assumption about how to do science, namely the assumption of methodological naturalism.

In the words of Vladimir Lenin, *What is to be done?* Design theorists aren't at all bashful about answering this question: *The ground rules of science have to be changed.* We need to realize that methodological naturalism is the functional equivalent of a full blown metaphysical naturalism. Metaphysical naturalism asserts that the material world is all there is (in the words of Carl Sagan, "the cosmos is all there ever was, is, or will be"). Methodological naturalism asks us for the sake of science to pretend that the material world is all there is. But once science comes to be taken as the only universally valid form of knowledge within a culture, it follows at once that methodological and metaphysical naturalism become for all intents and purposes indistinguishable. They are functionally equivalent. What needs to be done, therefore, is to break the grip of naturalism in both guises, methodological and metaphysical. And this happens once we realize that it was not empirical evidence, but the power of a metaphysical world view that was all along urging us to adopt methodological naturalism in the first place. Yes, the heavens still declare the glory of God, and yes, God's invisible attributes are clearly seen from God's creation. But to hear what the heavens declare and to see what the creation makes manifest, we need to get rid of our metaphysical blinders.

Darwin in hot water

"Darwinists deny the obvious" by Mark Hartwig. Citizen, Jun 24, 1996 (Vol 10, No 6). Pages 1-3.

In Southern California's Hemet Unified School District, Darwin's theory of evolution is standard fare. So why are some Darwinists upset? The district wants to teach evolution as science, presenting evidence both for *and* against it. Darwinists see this as heresy. Most believe, like paleontologist Kevin Padian of the University of California-Berkeley, that "there is no evidence against evolution."

•**The essence.** In a nutshell, Darwin's theory holds that "all life can be traced to a single ancestor through purely natural means." Nature, like a good breeder, surveys every organism, selects useful traits, and eliminates harmful ones. These changes accumulate over time, producing new and better organisms. It all occurs by chance, of course.

•**The evidence.** Fossil evidence has always been a problem for Darwinists; even Darwin acknowledged this. The fossil record *should* show gradual changes in species, but in fact, it does not. Two phenomena tend to discredit Darwin's theory: the sudden appearance of fully formed species and the tendency of species to change very little throughout their appearance in the fossil record.

•**The complexity.** Recent advances in biochemistry pose an even greater threat to Darwinism. Darwin himself recognized that "if any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." We now know that even the humblest bacterium, the "simplest self-replicating cell," has many irreducibly complex systems, says biochemist Michael Behe, author of the forthcoming book *Darwin's Black Box*.

•**The denial.** Darwinists remain mostly unfazed by the evidence against evolution. Their philosophical commitment—an unquestioning allegiance to naturalism—blinds them to any possible evidence against evolution, says Berkeley law professor Phillip Johnson, author of *Darwin on Trial*. God is out of the picture for Darwinists since, if He exists at all, He's more of an onlooker than a creator. ☹

Bones of Contention

RAY BOHLIN, Ph. D.

A RECENT ISSUE OF *TIME* MAGAZINE DISPLAYED A picture of *Homo erectus* on the cover with the title, "How Man Began." Not surprisingly, the article treated the theory of evolution as fact. Skeptical readers were left with the uncomfortable feeling that the entire thinking world believes humans evolved from ape-like ancestors.

A well-known poll, however, indicates that 47 percent of adults in the U.S. believe humans were created only 10,000 years ago—only 9 percent believe humans are the result of an evolutionary process in which God played no part.

How good is the evidence for human evolution? The answers may surprise you.

Southern Apes

The story begins about 3.5 million years ago with the appearance of a group of animals known as *australopithecines.* These "southern apes," initially discovered in South Africa, were small, apparently upright animals. Two million years ago, *Homo habilis* appeared. *Homo habilis* possessed the stature of the australopithecines but had a slightly larger brain. He may also have used a few primitive tools. Next came *homo erectus,* the star of human evolution. *Homo erectus* possessed a skeletal frame slightly more robust but basically similar to that of modern humans. His brain capacity was closer still to humans, and he used more advanced tools. This "almost" human endured, we're told, for over 1.5 million years, when nearly modern humans (*Homo sapiens*) began to appear. Finally, within the last 100,000 years, the offshoot neanderthals and thoroughly modern humans appeared.

Bones of Contention

Evolutionists confidently declare that, while there may be a lot of details missing from the story, this evolutionary progression from ape to man is fairly complete. But in his recent book, *Bones of Contention* (Baker, 1992), creationist Marvin Lubenow makes an important observation.

Lubenow notes that this evolutionary sequence, impressive as it seems, is actually artificial and arbitrary. First, fossils that do not fit well into this scheme have been excluded. Second, some human fossils have been downgraded—reclassified as human ancestors when they are true humans. And finally, some nonhuman fossils have been upgraded—also reclassified as human ancestors.

KP 271

Lubenow gives numerous examples to support his assertion. Two examples of his first point, that the fossil evidence is sometimes ignored or stretched if it doesn't fit the evolutionary scheme, are KP 271 and the Laetoli footprints.

The fossil evidence is sometimes ignored if it doesn't fit the evolutionary scheme.

KP 271 is a bone fragment of the lower end of an upper arm, near the elbow, that was found near Kanapoi, Kenya, in 1965. What is unusual about this bone is its date of around 4.5 million years—unusual because KP 271 appears to be a human bone. Humans are not supposed to have been around 4.5 million years ago. Consequently, this small piece of humerus is usually designated as Australopithecus, the only hominid species believed to exist at that time. Lubenow quotes Harvard anthropologist William Howells in a stunning admission:

> The humeral fragment from Kanapoi, with a date of about 4.4 million, could not be distinguished from *Homo sapiens*—morphologically or by multivariate analysis by Patterson and myself in 1967. . . . We suggested that it might represent Australopithecus because at that time allocation to *Homo* seemed preposterous, although it would be the correct one without the time element.

The only reason KP 271 is not listed as human is because it can't be, according to evolution.

The Laetoli Footprints

Second, Mary Leakey found a series of footprints near Laetoli, Tanzania, in the late 1970s. In *Origins Reconsidered,* Richard Leakey and Roger Lewin call them hominid footprints, and they are routinely classified as australopithecine. But Lubenow documents that these footprints are identical to those made today by humans that always walk barefoot.

In *Getting Here: The Story of Human Evolution,* William Howells refers to the conclusions of Russell Tuttle from the University of Chicago, a leading expert on hominoid gaits and limbs, as saying that the footprints are nearly identical to

"To the evolutionist there is but one primary fact in the universe: evolution. Everything else is just data. . . . Good data is that which supports evolution. Bad data is that which does not fit evolution, and it is to be discarded."

Marvin Lubenow
Bones of Contention
(1992)

"Students of fossil primates have not been distinguished for caution when working within the logical contraints of their subject. The record is so astonishing that it is legitimate to ask whether much science is yet to be found in this field at all."

Lord Zuckerman
Beyond the Ivory Tower
(1971)

"All the fossils which . . . are claimed to be ancestors—we haven't the faintest idea whether they are ancestors."

Richard Lewontin
In *Harper's*
(1985)

"In the course of rethinking my ideas about human evolution, I have changed somewhat as a scientist. I am aware of the prevalence of implicit assumptions and try harder to dig them out of my own thinking. . . . Theories have, in the past, clearly reflected our current ideologies instead of the actual data."

David Pilbeam
in *Human Nature*
(1978)

"Darwin's revolution remains incomplete, in Freud's crucial sense, until we face the cosmic insignificance that our own evolution truly implies—thus liberating us to grasp the deeply human meaning of our lives and most curious brainpower."

Stephen Jay Gould
in *Natural History*
(June 1994)

modern humans and that australopithecine feet are significantly different. Tuttle suggests an undiscovered species made these prints. He can't say a human made them, because humans aren't supposed to have existed yet. In the words of Howells, "Here is something of an enigma." Indeed!

The Human *Homo erectus*

Homo erectus is a good example of Lubenow's second point, the arbitrary downgrading of human fossils to make them appear to be our ancestors. *Homo erectus* is said to span the time from around 1.7 million to nearly 400,000 years ago. *Erectus* is admitted to have a fully human post-cranial skeleton (that is, everything but the head is human). But evolutionists say the brain size only approaches the average for humans. In reality, however, the brain size of *Homo erectus* is within the range of modern humans.

Evolutionists need an intermediate fossil, and Homo erectus *is their only option.*

Upright Apes?

The australopithecines are a good example of Lubenow's third point, the upgrading of non-human fossils to make them appear as human ancestors. Australopithecines are trumpeted as human ancestors because of their crude bipedal walking ability. But nearly everything else about them is ape-like. If australopithecines walked upright, their bipedality was distinct from that of apes and humans—not exactly what one would expect from a transitional form. But even the origin of their bipedality would be no small evolutionary task. Even Leakey admits as much when he writes that the change from walking on four legs to walking on two legs

> would have required an extensive remodeling of the ape's bone and muscle architecture and of the overall proportion in the lower half of the body. Mechanisms of gait are different, mechanics of balance are different, functions of major muscles are different—an entire functional complex had to be transformed for efficient bipedalism to be possible.

Yet these immense changes are not documented from the fossil record.

Throughout *Origins Reconsidered*, Leakey and Lewin document an impressive array of characteristics that distinguish the ape-like qualities of australopithecines from the human qualities of *Homo erectus*. But wherever *Homo erectus* fossils differ from humans, the differences can be explained by the effects of inbreeding, dietary restrictions, and a harsh environment. Evolutionists need an intermediate fossil, though, and *Homo erectus* is their only option.

A Creationist Perspective

So far we have discussed some of the significant problems with evolutionary explanations of ancient human remains. But questions still remain. Many of these remains do look very different from modern humans. What were they? Where did they come from? Does any of this make sense from a creationist perspective? While we need to be careful not to over-interpret the data as we have accused evolutionists of doing, there are a few suggestions that make some sense.

The first step is to recognize that *Homo erectus*, archaic *Homo sapiens*, neanderthals, and *Homo sapiens* form a continuum of the human family. The different forms represent genetic variation within a species, not distinct species. Many evolutionists themselves have difficulty drawing the line between these four labels.

For example, a group of human fossils from Kow Swamp, Australia, is no more than 13,000 years old yet contains many of the skull characteristics of *Homo erectus*. These characteristics can be explained by cultural modifications, not necessarily genetic differences. In other words, many of the characteristics of *Homo erectus* can be achieved in modern humans by lifestyle changes. These could include deliberate forehead compression, deformation due to inbreeding, and modifications due to dietary deficiencies and peculiarities. In *Genesis and Early Man*, the late Arthur Custance documented differences in the modern skulls of Eskimos due to the massive jaw muscles they developed because of their diet. Many of these characteristics would be labeled as primitive if they were dug up in some ancient river bed, yet they exist in fully modern humans today.

Marvin Lubenow suggests that many of these human fossils are the remains of individuals within the first millennia after the flood of Noah. The effects of the ice age, a constant cloud cover (preventing vitamin D formation, leading to rickets), a largely vegetarian and uncooked diet, and the expression of local genetic variation could readily account for the many different yet anatomically related human forms.

Were these ancient creatures ape-like animals that evolved into humans, or were they humans caught in a unique and harsh world that caused numerous interspecies variants? A creationist perspective, in this case, may lead to questions (and answers) evolutionists never ask. And after all, isn't that what science is all about?

AND—A KEY TO SUCCESSFUL OUTREACH

by David L. Dye

Most of us believe, though we cannot prove absolutely, that we live in a real, observable universe that operates in certain patterns or "laws," such as logic and causality. This belief allows us to do "science," attempting to understand and describe our universe as it really is. We Christians believe, though we cannot prove absolutely, that we live in a spiritual reality as well, different from and beyond the limits of the universe, made observable in the universe by Jesus Christ, confirmed within each person by the work of the Holy Spirit, and documented in the Bible.

Given these two beliefs, we Christians can construct a consistent conceptual framework for interpreting data and integrating data from the two accepted realities. I see five principles as the beams and crossbars forming that framework:

1) All truth is God's truth; therefore the natural laws are His doing and available for His use in whatever way He chooses.

2) Scientific data (or observations) are neutral, even if those who report them are not, and they can be useful as evidence for, or against, the accuracy of various theories or explanations of physical and spiritual reality.

3) Biblical data are statements in Scripture (in its originals, which are adequately close to the modern translations), and they can be useful in supporting or refuting the accuracy of various theories or explanations of spiritual reality—and of physical reality, too, because the two realities intersect in the universe. However, because biblical data come in words, and because verbal expression involves rhetorical forms and devices, e.g., poetry, narrative, prophecy, prayer, parable, metaphor, simile, allegory, irony, etc., they require appropriate interpretation—guided by God's Spirit.

4) All data, both scientific and biblical, must be interpreted together. The two realms of data do not exist in isolation from each other; they overlap significantly. The physical world has meaning beyond itself. The spiritual world finds expression in the physical world. Humans are innately compelled to search for meaning. God graciously chooses to reveal meaning.

5) All human knowledge is limited and tentative, not absolute. We cannot and do not know everything about anything. God's knowledge is unlimited and absolute, because God is the source of all reality. Consistency of data interpretation we call "proof." But proof represents *an* interpretation of data, not necessarily *the* interpretation. Therefore, we "live by faith, not by sight" (2 Cor. 5:7).

I see these principles and the perspective they offer as helpful tools for resolving science "versus" Christianity issues, including (but not limited to) the creation-evolution controversy. Bio-evolution is an interpretive term for the neutral scientific data showing that life emerged, proliferated, and changed on Earth through time. It describes two mechanisms by which change can and does occur: natural selection and gene mutations. Darwinism posits that these gene mutations occur spontaneously and randomly without any "unnatural" influence and explain all of bio-evolution. Scripture states that God acted, using in one way or another the natural laws He established, to bring biological entities into existence and into the forms we observe. Darwinism thus defined conflicts with Scripture

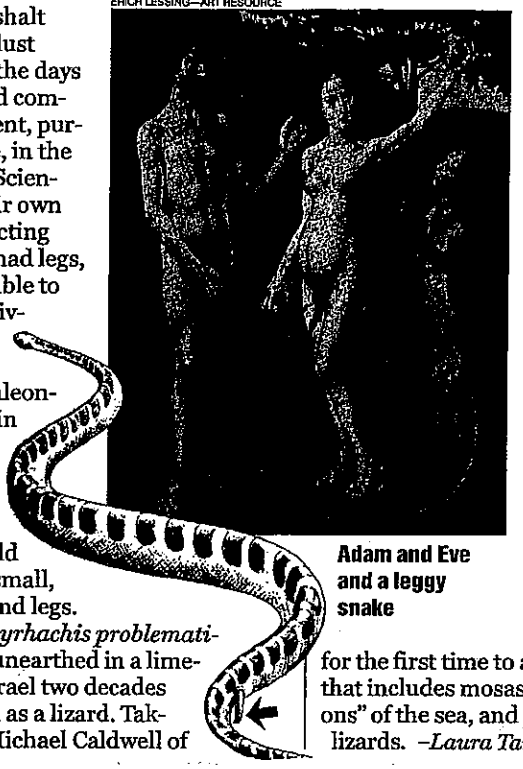
All data, both scientific and biblical, must be interpreted together. The two realms of data do not exist in isolation from each other

Snakes didn't always slither

"Upon thy belly shalt thou go, and dust shalt thou eat all the days of thy life." So God commanded the serpent, purveyor of the apple, in the Garden of Eden. Scientists long had their own reasons for suspecting that snakes once had legs, but they were unable to find a specimen, living or extinct, with well-formed limbs. But, two paleontologists, writing in the journal *Nature*, say they have found the missing link: a 97-million-year-old fossil snake with small, well-developed hind legs.

The fossil, *Pachyrhachis problematicus*, was actually unearthed in a limestone quarry in Israel two decades ago and described as a lizard. Taking a fresh look, Michael Caldwell of the University of Alberta, Canada, and Michael Lee of the University of Sydney, Australia, now say it is the most primitive snake ever discovered. They base this conclusion on two features—a hinged upper jaw and a skull that completely encloses the brain—not found in lizards. The fossil also provides strong evidence that *Pachyrhachis* was a marine reptile, challenging a widely held belief that snakes evolved on land from burrowing lizards.

ERICH LESSING—ART RESOURCE



Adam and Eve and a leggy snake

The find not only establishes once and for all that snakes used to be legged but, the scientists say, it also links snakes for the first time to a specific group of lizards that includes mosasaurs, the extinct "dragons" of the sea, and perhaps today's monitor lizards. *–Laura Tangley*

thus interpreted, but bio-evolution and scriptural data do not conflict. Genesis One and other portions of Scripture describe bio-evolution. They also declare God's involvement in the process, without presenting the technical details of how He accomplished it.

I propose that we Christians place the word *and* between creation and evolution and stop using the word versus, which only pits scientists against us and us against them. The *and* works much more effectively to communicate humility and a learner's approach. The important issue, after all, is the meaning of life. Even if other life forms go extinct, He has made us humans spiritual and, thus, with a link to reality (His reality) beyond the space and time of the physical universe. And though we humans, in Adam and Eve, failed the test of perfection and lost our innocence, we did not lose our spiritual nature. According to the biblical data, God came to us in human form to make a way of reconciliation, to restore the possibility of eternal fellowship with Him for all who are willing to accept His way (John 7:17).

My concern is that we focus our energy on loving (rather than battling) people whose opinions and interpretations differ from our own. We can state our position, raise questions about others' interpretations, and give reasons for our convictions without expressing arrogance and condemnation. God will judge men for their response to His revelation, but He will also reprove us for our judgmental attitudes (see Romans 14:1, 4, 8-12, 17-18 and Matthew 7:1-2). My hope is that we who acknowledge Christ as Lord will together make it our top priority to communicate the good news that God has opened a way for us imperfect, irretrievably (on our own) rebellious humans to be rescued, to be reborn spiritually into an unbreakable familial relationship with Him. ■

Dr. Dye earned his Ph.D. in physics from the University of Washington with a thesis on cosmic rays. After some Navy duty and teaching, he returned to the Seattle area to do research for Boeing. Today he lives near Seattle and works as a consultant in radiological physics. His book Faith and the Physical World *(1966, 1970) expresses the message he has brought to youth conferences and adult Sunday school classes for many years: science and Christianity can be compatible.*

EXCERPT

A TINY SAMPLE OF *BEYOND THE COSMOS*

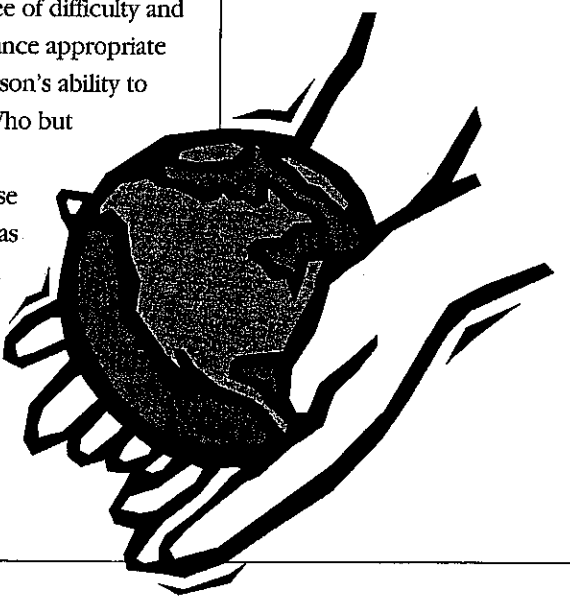
by Hugh Ross

The faith to "see" God in the extra dimensions from which our universe began and beyond comes not from ourselves, as Paul says, but from the Spirit of God. It is the Spirit who alone can reveal to us an extra-dimensional God and enable us to understand the extra-dimensional salvation offered by the Father, transacted by the Son, and imparted by the Holy Spirit.

The amazing discoveries in particle physics and astrophysics highlighted in the opening chapters of this book take none of the mystery away from "the deep things of God." If anything, they distinguish for the skeptics of our day the mysteriousness of divine truth from the imaginativeness of human fantasy. The discoveries affirming the existence of extra dimensions simply attest that God's power and wisdom and all other capacities exceed ours by so many orders of magnitude, they bear no resemblance to human, four-dimensional thinking.

- What other God but the God revealed in the Bible promises to be nearer to each of us than we are to ourselves, beyond the reach of our physical senses yet fully within the reach of the spiritual sense He placed within us?
- What other God but the God revealed in the Bible claims to have planned and initiated the physical universe from dimensions beyond and independent of it?
- What other God but the God revealed in the Bible can see and hear everything, including the thoughts and prayers of every living being at every moment?
- What other God but the God revealed in the Bible has come tangibly to affirm His existence, His power, His truth, and His love through a human body, seeking no glory for self in that body but for God alone?
- What other God but the God revealed in that body could take upon Himself the penalty for humanity's waywardness since Adam and Eve and could wield the power to rise bodily from the dead?
- What other God but the God revealed in the Bible claims to be simultaneously singular and plural, Father, Son, and Holy Spirit, not three gods but a triune deity, and proves His capacity to be such?
- What other God but the God revealed in the Bible could accurately communicate through human authors the distinctive capacities of His created life forms from plants to animals to mammals and birds to humans in terms that scientific research thousands of years later proves precisely accurate? And what mind could contrive such creatures as He calls angels, archangels, cherubim, and seraphim?
- What other God but the God revealed in the Bible shows total character consistency in all His messages to and dealings with the human race?
- What other God but the God revealed in the Bible finds a way to give humans freedom of choice and yet works within that freedom to fulfill all His divine purposes and plans?
- What other God but the God revealed in the Bible could devise a way to secure our eternal destiny while retaining forever our freedom to choose or reject Him?
- What other God but the God revealed in the Bible could design and administer a pass or fail "heart" test for each human being with the exact degree of difficulty and time allowance appropriate for that person's ability to respond? Who but God could make full use of that test as preparation for our future career in His new creation?
- What other God but the God revealed in the Bible could find a way to express love toward those beings who hate Him and choose eternal separation from His authority and glory?
- What other God but the God revealed in the Bible promises His children an inheritance remotely like the new creation, a place that makes Eden look paltry and pale by comparison, a place where we will find the perfection of love, joy, and wholeness for which we all perpetually yearn?
- What other God but the God revealed in the Bible would provide for us, as Boaz provided for Ruth, not just the gleanings from the harvest of scientific truth, but "six measures of barley"—geometrically multiplying evidences of His intention to provide for all our faith needs in this increasingly irreverent, arrogant, self-destructing world? ■

See "Resources in Review" to order *Beyond the Cosmos.*



SHOUTING "HERESY" IN THE TEMPLE OF DARWIN

Naturalism has become the civil religion of our universities. A game plan for Christian response.

PHILLIP E. JOHNSON

When I was in college, a professor told a story about a boy from a backwoods family who was being interviewed by a visiting anthropologist. Asked about his siblings, the boy proudly declared that his brother was at Harvard. The astonished anthropologist asked what the brother was studying. "It's not that way," replied the boy. "They're studying him."

Likewise, the academic world regards Christian theism as an object for study rather than as a participant in academic discourse, as Notre Dame history professor George Marsden has shown (see his new book *The Soul of the American University,* Oxford). The standards of academia discourage a professor who is teaching, say, the history of Christianity from taking the position that Christianity may be true. Such restrictions do not apply to advocates of other viewpoints. Socialists teach socialism, and feminists teach women's studies. As Marsden wrote in the *Wall Street Journal* (Dec. 22, 1993), "Many contemporary academics insist that the only respectable place for religion in the academy is on the syllabus—as an object of study—where it may be subordinated to Western scientific methods of analysis."

Sometimes this double standard requires that a thinker or group be split into two parts, to separate the politically correct from the incorrect. In Marsden's words: "One conspicuous example is that, although universities welcome African-Americans and build programs in African-American studies, they find little place for positive evaluations of the dominant religion of African-American culture." One might paraphrase this point by saying that the secular content of the Reverend Martin Luther King's views on racial justice has a very different status from the religious background of those same views. The former goes to the university as an honored participant; the latter only as an object of scientific study. Why is that?

ACADEMIC FREEDOM?

One reason is that secularists employ a definition of rationality that allows no place for a supernatural Creator. An ongoing academic freedom case at San Francisco State University provides a striking example of the disapproval with which the scientific community regards the concept of a God who threatens to become a reality we cannot ignore. Biology professor Dean Kenyon was the co-author some 20 years ago of a respected book titled *Biochemical Predestination* that supported the orthodox scientific theory that living organisms evolved from nonliving chemicals through natural chemical processes. As the years went by, Kenyon's doubts grew, however, and eventually he concluded that the evidence did not support the assumption that unintelligent material processes are capable of forming living organisms by chemical evolution.

As instructor of a large introductory course for nonmajors, Kenyon taught the prevailing theories of chemical and biological evolution, but he also taught the weaknesses of those theories and suggested to his classes that life might in fact be the product of "intelligent design"—however distasteful that prospect might be to orthodox scientific materialists. A few students complained, and the professor was called on the carpet. The dean of science told him that his teaching of intelligent design amounted to biblical creationism, and that to consider this possibility favorably was to bring the forbidden topic of religion into science. To ensure that he had no further opportunity to advocate such absurdities, Kenyon was removed from his regular classroom duties and relegated to laboratory supervision.

Professor Kenyon challenged this administrative action by bringing a complaint before San Francisco State University's Academic Freedom Committee. The committee ruled that professors of biology, like those who teach other subjects, have a right to dissent from the prevailing orthodoxy in their field. It therefore unanimously urged the administrators to reinstate Kenyon in the classroom. The dean and the department chair balked at first, but they gave way after the full academic senate voted to support the committee's recommendation.

Kenyon won a victory, but the conflict is not over. In late February, the Biology faculty at San Francisco State adopted, by a vote of 27 to 5, a resolution declaring that "There is no scientific evidence to support the concept of intelligent design," and that therefore "the intelligent design view is not scientific." In context, the statement, like many others on the subject from the scientific community, combines two discordant propositions. On the one hand, the scientific authorities want to say that intelligent design is not eligible for consideration because it is religion, not science, and hence cannot be tested. On the other hand, they want to say that they

MINDEN PICTURES, FRANS LANTING

have thoroughly tested the concept and rejected it as false. The apparent purpose of this confused declaration is to set the stage for another effort to prevent Kenyon from suggesting to students that there really is evidence for intelligent design, but what will happen next is anybody's guess.

Debating Darwinism

The Kenyon case thus constitutes only a limited victory for those who believe that genuine academic freedom requires a hearing for theistic thinking about problems such as the origin of life; but even this limited victory reflects the fact that a debate about the dogmas of naturalistic evolution has been successfully launched in the universities. In that debate, considerable attention has been paid to my own book *Darwin on Trial* (InterVarsity), and to the lectures on Darwinism that I have given on many university campuses, some of which have been widely distributed on videotape. Other Christian thinkers have also made substantial contributions to the debate. For example, Whitworth College philosophy professor Steven Meyer published a fine essay on the Kenyon case in the *Wall Street Journal* just before San Francisco State's academic senate voted on the matter. Kenyon's colleagues thus knew that he was not an isolated individual, but a person asserting a position that has support in the society at large.

The example of naturalistic evolution tells us why theistic thinking has so little standing in the academic world. The contemporary academic world takes for granted a philosophy called scientific naturalism. According to this philosophy, nature is "all there is," which is to say the cosmos is a closed system of material causes and effects that can never be influenced by anything outside of nature—like God—for existence.

The academic world regards Christian theism as an object for study rather than as a participant in academic discourse.

"God," in this system of thought, is a product of the human imagination and largely a remnant of prescientific ignorance. At one time, humans believed in a host of gods living in places like Mount Olympus and attributed natural events like storms and fires to the whims of these beings. As knowledge advanced, humans gradually put aside the lesser spirits but retained the one Supreme Being as the cause of our existence.

At last, the greatest scientific discovery of all was made, and humans learned that we are the products of a combination of chance events and impersonal natural laws. This discovery set the stage for the famous "death of God," the insight that man created God rather than the other way around. The most advanced and influential thinkers thereafter ignored the Creator altogether, or they looked for a way to conform religion to naturalism through liberal theology. Others retained some remnant of supernatural religion by imagining the Creator as responsible for establishing the laws of nature at the ultimate beginning of the cosmos, where scientific investigation is unable to penetrate.

Naturalistic philosophy is not necessarily hostile to the "idea of God." On the contrary, that is just the point. For philosophical naturalists, God is not an independent reality but an idea in the human mind. Proper naturalists do not insist upon the nonexistence of God because that is to take the issue more seriously than it deserves. Instead, they consign the whole subject to the category of "religious belief," which is understood to be a product of the human imagination. Although God does not exist, or at least does not take part in historical events, beliefs about God do exist and have important consequences. Such religious *belief* contrasts with scientific *knowledge*. The difference is that beliefs are untestable and hence valid only for the person who holds them, whereas knowledge is objective and hence valid for everyone. That is why, in an educational system based on naturalistic principles, naturalistic evolution may be taught to students as fact regardless of whether they or their parents object. No statements assuming the objective existence of God may be made, however, because no student should have to listen to subjective beliefs being presented as if they were facts.

Genteel Nihilism

Naturalistic philosophy has ethical consequences, and these are also manifest in public education and law. At one time it was thought possible to find a basis for morality and justice in science itself, but with the fall of Marxism, that hope has been discredited. The current fashion in academia is a genteel nihilism. Because scientific knowledge extends only to questions of fact and not to questions of value, matters of morality are inherently subjective and relative. In consequence, students in public schools are taught that they must choose standards of morality themselves and should subject all morality that comes to them by tradition or training in the home to critical analysis.

The predominance of naturalistic assumptions in the universities and colleges guarantees that theistic thinking will be taken more as a personal eccentricity than as a serious contribution to knowledge. What is the value of a theism that is founded upon unreality? As naturalists see it, when God died, humankind lost nothing important because we still retained the goodness and rationality that we had projected onto this imaginary father figure in the first place. To bring God back into the picture now is, at worst, to embrace irrationality or, at best, to add some superfluous God-talk to ideas that are justifiable on naturalistic grounds. The most favorable thing you can say about a Christian theist in academia is that his work is so good you would never have guessed he was a Christian.

Many Christian college and seminary professors have understandably wanted to win the respect of their peers in the secular academic world, and so they have worked mightily to reconcile the naturalistic understanding of knowledge with Christian faith. Intelligent naturalists do not necessarily disapprove of this effort, provided it is clear who is in charge. What they do insist upon is that subjective religious belief must always conform itself to objective scientific knowledge, never the other way around. Thus, if a Christian college professor teaches "evolution" exactly as Carl Sagan or Stephen Jay Gould would teach it, he may append a theistic interpretation that characterizes the process as God's way of creating. This interpretation will earn him no great credit from naturalists, but they will be tolerant so long as it is clear that the theism in "theistic evolution" refers to a personal

reflection upon a process that is objectively explainable on a naturalistic basis. If a professor were to give his theism some scientific content—for example, by suggesting that pre-existing intelligence may be required to make living organisms from nonliving chemicals—he would forfeit instantly his standing in the scientific community and the secular academic world. Like Dean Kenyon, he would be accused of injecting subjective "religion" into the objective realm of science.

Biblical creationists who challenge the theory of evolution on a combination of scriptural and scientific grounds have fared no better. Their premise, that the Bible has some standing as a record of natural history, seems nonsensical to those who see the world through naturalistic spectacles. To metaphysical naturalists, the Bible belongs to the realm of religion, whereas the history of life on earth belongs to the naturalistic realm of science. There is no reason whatever to expect the two to be consistent, because the biblical account of natural history is deemed to be composed of prescientific legends. The program of squaring science with the Bible is thus about as sensible as trying to square the scientific account of childbirth with the story that the stork brings babies. For naturalists, the proper way of reconciling science and Scripture is to adopt a naturalistic interpretation of Scripture. This is accomplished through what is called the "higher criticism" of the Bible, and it is the orthodox theory of interpretation in most mainline seminaries today.

What works, what doesn't

If neither theistic evolution nor biblical creationism is effective in challenging the domination of scientific naturalism in our colleges and universities, what approach does have a chance of success? When I began writing my book *Darwin on Trial,* several basic points were clear to me:

First, the Darwinian theory of evolution is not merely or primarily a scientific theory of interest to professional scientists in their laboratories and classrooms. It is, first and foremost, a creation story for the culture, a story that is endorsed by government and propagated through the media and the public schools. The story tells us that we were created by blind and purposeless material processes rather than by a purposeful Creator who cares about what we do and what happens to us. The theory entails a naturalistic view of God, whether or not that implication is made explicit in a particular textbook or television program.

Second, what is fundamentally important about the Darwinian theory is not the claim that biological creation was a gradual, long-term process. The important claim is that purposeless material processes, such as random mutation and natural selection, were capable of doing all the work of biological creation so that there is no need for a Creator. This claim—which I call the Blind Watchmaker thesis—masquerades as something that has been proved by scientific evidence. On the contrary, the evidence that the mutation/selection mechanism can create new complex organs or new types of organisms is somewhere between very weak and nonexistent. The Blind Watchmaker mechanism is a child of metaphysical naturalism, not of empirical science. It survives because the leading alternative is supernatural creation, which is unacceptable to the rules of today's science.

The Darwinian theory of evolution is not merely or primarily a scientific theory; it is first and foremost a creation story for the culture.

Third, the all-important task was to mount a critique of the Blind Watchmaker thesis that the academic and scientific culture could not easily ignore. To do this, it was necessary to put aside all questions of biblical interpretation or veracity and to concentrate entirely on the claims of Darwinism. In the academic world, a Bible/science debate is a nonstarter, because it invokes a stereotype that shuts off thought. What was needed was to press questions that are legitimated within the context of mainstream academic thinking, questions about what has been proved about evolution and what has merely been assumed.

Finally, conditions were, in many respects, more favorable for a re-examination of Darwinism in the 1990s than previously. During the 1980s, widespread publicity had been given to the writings of certain prominent fossil experts, who had insisted that the fossil record was incompatible with the Darwinian picture that major evolutionary changes occur in gradual increments by the accumulation of tiny random mutations through natural selection. The Darwinists had proposed a subtheory to solve the problem, called punctuated equilibria or "punk eek," but this improvisation was vulnerable to criticism. The very need for a new theory to deal with the fossil record indicated that the problem was conceded to be serious.

Rethinking the history of science

At a more general level, philosophies of science were being discussed at the university level that called into question whether the scientific enterprise is as objective as had been claimed. Some authorities at leading universities called themselves "social constructivists" and preached that scientific theories, including Darwinism, reflect the political and social conditions of their times. It had become common to talk of paradigms, and paradigm shifts, and potential revolutions in scientific thought. That modern science could be captured by some philosophical notion, and used for political or religious purposes, was no longer unthinkable. Indeed, the pseudosciences called Marxism and Freudianism have lost their scientific standing in recent years, and Darwin, Marx, and Freud are often grouped as the thinkers who most profoundly influenced the twentieth century. As a result of these developments, critics of Darwinism had an unprecedented opportunity to make their points in language that the academic world was used to hearing.

The argument of *Darwin on Trial* was shaped by these considerations and expressed in language judged most likely to be intelligible to a contemporary academic audience. At the same time, the argument was uncompromising on the main issue, which is the validity of naturalism as a starting point for modern thought, scientific or otherwise. I insisted upon asking whether naturalism is true, even though the immediate response from critics was that to ask such a question showed I did not "understand how science works." My objective was not to please the naturalists, or to compromise with them, but to bring

out into the open the essential assumptions they were hiding, and thus to make those assumptions vulnerable to criticism.

By now it is clear that this strategy has met with considerable success. My book is selling well and is being used in college courses at a number of institutions. I have spoken at dozens of universities and colleges, in many cases with the full approval of academic authorities at official events and even in courses dealing with evolutionary biology. Many leading figures in science and philosophy have reviewed the book and thus have been drawn further into the discussion of fundamental assumptions. As the discussion continues, evolutionary biology professors will find it increasingly difficult to get away with a dogmatic approach to the controversy.

One example will indicate the problems that are ahead for Darwinists as the debate continues and expands. Michael Ruse, a leading academic defender of Darwinism, gave a talk about me at the 1993 annual meeting of the American Association for the Advancement of Science. The talk was supposed to be an attack, but Ruse actually conceded the main point at issue between us. Darwinism is founded upon a naturalistic picture of reality, he conceded, and this assumption needs to be defended honestly rather than concealed. That concession will be fatal if the evolutionary scientists agree to make it, because the Darwinian version of evolution has hitherto been presented to the public as value-free fact. Biologists have authority to tell us facts that they know from the study of biology, but they have no intellectual or moral authority to order us to adopt a particular philosophy that they happen to prefer. Once the crucial influence of philosophy is admitted, nonbiologists and even ordinary people must be allowed to decide whether to believe what the biologists are saying.

We need to stop talking about the separate realms of religion and science, and start talking about truth.

Surprising Resistance

Ironically, while my critique of Darwinism and scientific naturalism has gained a hearing in secular academic debates, it has met with surprising resistance from theistic evolutionists in the Christian academic world. That many Christian college and seminary professors are ardent defenders of Darwinism may seem astonishing, but it is true. There are many reasons for this, including the powerful indoctrination aspiring professors receive in graduate schools. Perhaps the most important factor is that the reigning assumption among Christian intellectuals in recent years has been that, given the futility of fighting a war with science, the best hope for saving Christianity in modern culture is to show that Christian theism can coexist with scientific knowledge, including the theory of evolution. This assumption gave theistic evolutionists an enormous stake in believing that what the rulers of science tell us about evolution is true (and hence unbeatable), and that it is religiously neutral (and hence acceptable).

Neither of those beliefs is correct. What theistic evolutionists have failed above all to comprehend is that the conflict is not over "facts" but over ways of thinking. The problem is not just with any specific doctrine of Darwinian science, but with the naturalistic rules of thought that Darwinian scientists employ to derive those doctrines. If scientists had actually observed natural selection creating new organs, or had seen a step-by-step process of fundamental change consistently recorded in the fossil record, such observations could readily be interpreted as evidence of God's use of secondary causes to create. But Darwinian scientists have not observed anything like that. What they have done is to assume as a matter of first principle that purposeless material processes can do all the work of biological creation because, according to their philosophy, nothing else was available. They have defined their task as finding the most plausible—or least implausible—description of how biological creation could occur in the absence of a creator. The specific answers they derive may or may not be reconcilable with theism, but the manner of thinking is profoundly atheistic. To accept the answers as indubitably true is inevitably to accept the thinking that generated those answers. That is why I think the appropriate term for the accommodationist position is not "theistic evolution," but rather *theistic naturalism.* Under either name, it is a disastrous error.

Speaking So Secularists Listen

How are we to speak so that secularists will listen? First, we have to understand how secularists—in this context, that means those who subscribe to scientific naturalism—think, and what particular words mean in their system of thinking. A message, however eloquent it may sound to us, is a mere noisy gong or clanging cymbal to those who have a different frame of reference. I believe that wise old missionaries have always given that kind of advice to newcomers in the field. Jesus as the Good Shepherd makes no sense to tribes that have never heard of sheep. Likewise, framing an argument in "religious" terms guarantees its rejection by people who have been brought up to think that religion means about the same thing as fantasy. We need to stop talking about the separate realms of religion and science and start talking about truth.

When we understand how secularists think, the next step is to understand what the primary issue is so we can focus on that and leave secondary issues for later. Deciding what is primary and what is secondary is often difficult, but in the case of evolution, it was easy for me. The primary point is not how long it took God to create, or whether he created things abruptly or gradually, or whether the first chapters of Genesis are to be interpreted literally or figuratively. These are all important issues in their way, but they are secondary. The primary issue is whether God created us at all. The naturalists say that our creator was not an all-knowing and loving God, but a combination of chance events and impersonal natural laws. What is more, they claim that evolutionary science has proved this to be the case.

If the naturalists were right, then Christian theists would deserve their marginalized status in the academic world. But the naturalists are not right. They are very, very wrong. And if we learn to think clearly, we can show it. CT

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DISCOVER, January 1987.

ESSAY

DARWINISM DEFINED: THE DIFFERENCE BETWEEN FACT AND THEORY

BY STEPHEN JAY GOULD

Charles Darwin, who was, perhaps, the most incisive thinker among the great minds of history, clearly divided his life's work into two claims of different character: establishing the fact of evolution, and proposing a theory (natural selection) for the mechanism of evolutionary change. He also expressed, and with equal clarity, his judgment about their different status: confidence in the facts of transmutation and genealogical connection among all organisms, and appropriate caution about his unproved theory of natural selection. He stated in the *Descent of Man:* "I had two distinct objects in view; firstly, to show that species had not been separately created, and secondly, that natural selection had been the chief agent of change . . . If I have erred in . . . having exaggerated its [natural selection's] power . . . I have at least, as I hope, done good service in aiding to overthrow the dogma of separate creations."

Darwin wrote those words more than a century ago. Evolutionary biologists have honored his fundamental distinction between fact and theory ever since. 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. As I wrote in an early issue of this magazine (May 1981), "Einstein's theory of gravitation replaced Newton's, but apples did not suspend themselves in mid-air pending the outcome."

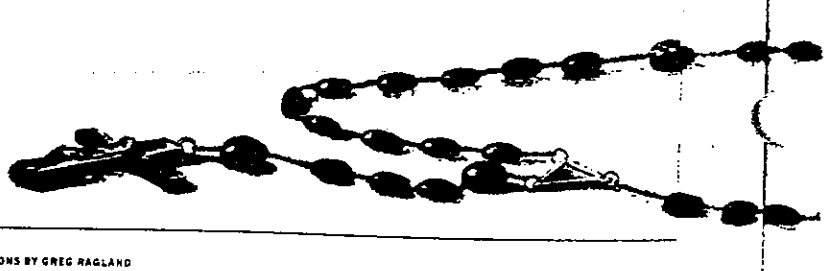
Since facts and theories are so different, it isn't surprising that these two components of science have had separate histories ever since Darwin. Between 1859 (the year of publication for the *Origin of Species)* and 1882 (the year of Darwin's death), nearly all thinking people came to accept the fact of evolution. Darwin lies beside Newton in Westminster Abbey for this great contribution. His theory of natural selection has experienced a much different, and checkered, history. It attracted some notable followers during his lifetime (Wallace in England, Weismann in Germany), but never enjoyed majority support. It became an orthodoxy among English-speaking evolutionists (but never, to this day, in France or Germany) during the 1930s, and received little cogent criticism until the 1970s. The past fifteen years have witnessed a revival of intense and, this time, highly fruitful debate as scientists discover and consider the implications of phenomena that expand the potential causes of evolution well beyond the unitary focus of strict Darwinism (the struggle for reproductive success among organisms within populations). Darwinian selection will not be overthrown; it will remain a central focus of more inclusive evolutionary theories. But new findings and interpretations at all levels, from molecular change in genes to patterns of overall diversity in geological time, have greatly expanded the scope of important causes—from random, selectively neutral change at the genetic level, to punctuated equilibria and catastrophic mass extinction in geological time.

In this period of vigorous pluralism and intense debate among evolutionary biologists, I am greatly saddened to note that some distinguished commentators among non-scientists, in particular Irving Kristol in a *New York Times* Op Ed piece of Sept. 30, 1986 ("Room for Darwin and the Bible"), so egregiously misunderstand the character of our discipline and continue to confuse this central distinction between secure fact and healthy debate about theory.

I don't speak of the militant fundamentalists who label themselves with the oxymoron "scientific creationists," and try to sneak their Genesis literalism into high school classrooms under the guise of scientific dissent. I'm used to their rhetoric, their dishonest mis- and half-quotations, their constant repetition of "useful" arguments that even they must recognize as nonsense (disproved human footprints on dinosaur trackways in Texas, risible misinterpretation of thermodynamics to argue that life's complexity couldn't increase without a divine boost). Our struggle with these ideologues is political, not intellectual. I speak instead of our allies among people committed to reason and honorable argument.

Kristol, who is no fundamentalist, accuses evolutionary biologists of bringing their troubles with creationists upon themselves by too zealous an insistence upon the truths of Darwin's world. He writes: ". . . the debate has become a dogmatic crusade on both sides, and our educators, school administrators, and textbook publishers find themselves trapped in the middle." He places the primary blame upon a supposedly anti-religious stance in biological textbooks: "There is no doubt that most of our textbooks are still written as participants in the 'warfare' between science and religion that is our heritage from the 19th century. And there is also little doubt that it is this pseudoscientific dogmatism that has provoked the current religious reaction."

Kristol needs a history lesson if he thinks that current creationism is a product of scientific intransigence. Creationism, as a political movement against evolution, has been a continually powerful force since the days of the Scopes trial. Rather than using evolution to crusade against religion in their texts, scientists have been lucky to get anything at all about evolution into books for high school students ever since Scopes's trial in 1925. My own high school biology text, used in the liberal constituency of New York City in 1956, didn't even mention the word evolution. The laws that were used against Scopes and cowed textbook publish-



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ILLUSTRATIONS BY GREG RAGLAND

Why some distinguished non-scientists egregiously misunderstand the nature of evolution

ers into submission weren't overturned by the Supreme Court until 1968 *(Epperson* v. *Arkansas).*

But what about Kristol's major charge—anti-religious prejudice and one-dimensional dogmatism about evolution in modern textbooks? Now we come to the heart of what makes me so sad about Kristol's charges and others in a similar vein. I don't deny that some texts have simplified, even distorted, in failing to cover the spectrum of modern debates; this, I fear, is a limitation of the genre itself (and the reason why I, though more of a writer than most scientists, have never chosen to compose a text). But what evidence can Kristol or anyone else provide to demonstrate that evolutionists have been worse than scientists from other fields in glossing over legitimate debate within their textbooks?

Consider the evidence. Two textbooks of evolution now dominate the field. One has as its senior author Theodosius Dobzhansky, the greatest evolutionist of our century, and a lifelong Russian Orthodox; nothing anti-religious could slip past his watchful eye. The second, by Douglas Futuyma, is a fine book by a kind and generous man who could never be dogmatic about anything except intolerance. (His book gives a fair hearing to my own heterodoxies, while dissenting from them.)

When we come to popular writing about evolution, I suppose that my own essays are as well read as any. I don't think that Kristol could include me among Darwinian dogmatists, for most of my essays focus upon my disagreements with the strict version of natural selection. I also doubt that Kristol would judge me anti-religious, since I have campaigned long and hard against the same silly dichotomy of science versus religion that he so rightly ridicules. I have written laudatory essays about several scientists (Burnet, Cuvier, Buckland, and Gosse, among others) branded as theological dogmatists during the nineteenth-century reaction; and, while I'm not a conventional believer, I don't consider myself irreligious.

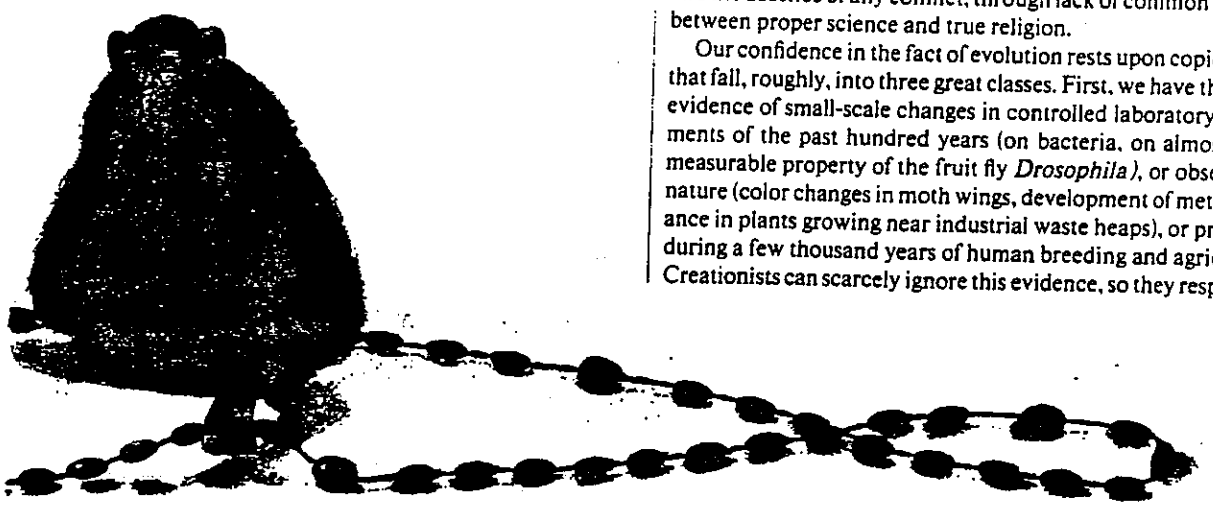
Kristol's major error lies in his persistent confusion of fact with theory. He accuses us—without giving a single concrete example, by the way—of dogmatism about *theory* and sustains his charge by citing our confidence in the *fact* of transmutation. "It is reasonable to suppose that if evolution were taught more cautiously, as a conglomerate idea consisting of conflicting hypotheses rather than as an unchallengeable certainty, it would be far less controversial."

Well, Mr. Kristol, evolution (as theory) is indeed "a conglomerate idea consisting of conflicting hypotheses," and I and my colleagues teach it as such. But 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 planets.

The fact of evolution is as well established as anything in science (as securely founded as the revolution of the earth about the sun), though absolute certainty has no place in the lexicon of scientists

Rather than castigate Mr. Kristol any further, I want to discuss the larger issue that underlies both this incident and the popular perception of evolution in general. If you will accept my premise that evolution is as well established as any scientific fact (I shall give the reasons in a moment), then why are we uniquely called upon to justify our chosen profession; and why are we alone subjected to such unwarranted infamy? To this central question of this essay, I suggest the following answer. We haven't received our due for two reasons: (1) a general misunderstanding of the different methods used by all historical sciences (including evolution), for our modes of inference don't match stereotypes of "*the* scientific method"; and (2) a continuing but unjustified fear about the implication both of evolution itself and of Darwin's theory for its mechanism. With these two issues resolved, we can understand both the richness of science (in its pluralistic methods of inquiry) and the absence of any conflict, through lack of common content, between proper science and true religion.

Our confidence in the fact of evolution rests upon copious data that fall, roughly, into three great classes. First, we have the 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. Creationists can scarcely ignore this evidence, so they respond by



ESSAY

You see, now I've blown our cover. We scientists do have our passionate debates.

arguing that God permits limited modification within created types, but that you can never change a cat into a dog (who ever said that you could, or that nature did?).

Second, we have direct evidence for large-scale changes, based upon sequences in the fossil record. The nature of this evidence is often misunderstood by non-professionals who view evolution as a simple ladder of progress, and therefore expect a linear array of "missing links." But evolution is a copiously branching bush, not a ladder. Since our fossil record is so imperfect, we can't hope to find evidence for every tiny twiglet. (Sometimes, in rapidly evolving lineages of abundant organisms restricted to a small area and entombed in sediments with an excellent fossil record, we do discover an entire little bush—but such examples are as rare as they are precious.) In the usual case, we may recover the remains of side branch number 5 from the bush's early history, then bough number 40 a bit later, then the full series of branches 156-161 in a well preserved sequence of younger rocks, and finally surviving twigs 250 and 287.

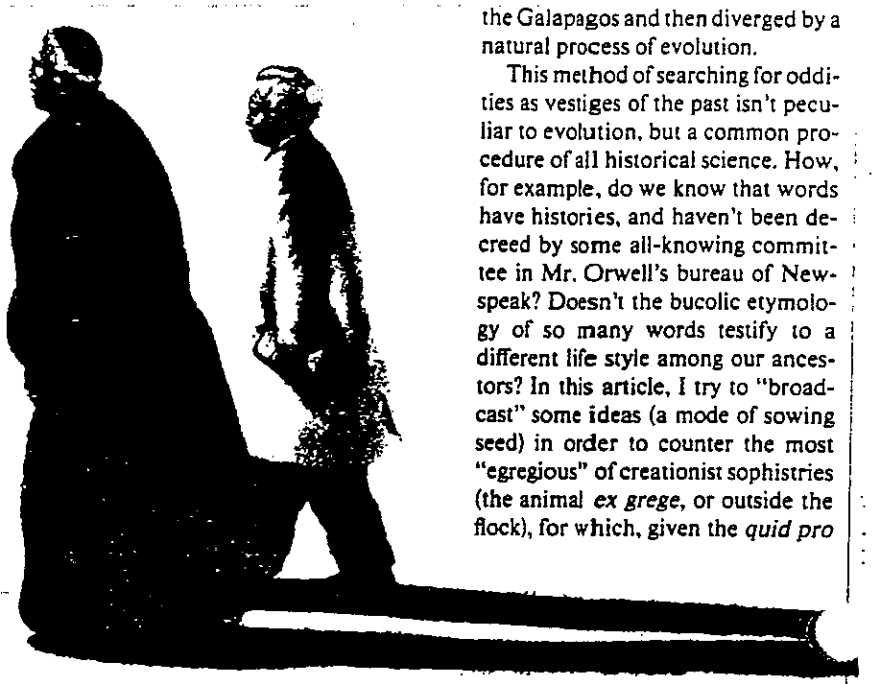
In other words, we usually find sequences of structural intermediates, not linear arrays of ancestors and descendants. Such sequences provide superb examples of temporally ordered evolutionary trends. Consider the evidence for human evolution in Africa. What more could you ask from a record of rare creatures living in terrestrial environments that provide poor opportunity for fossilization? We have a temporal sequence displaying clear trends in a suite of features, including threefold increase of brain size and corresponding decrease of jaws and teeth. (We are missing direct evidence for an earlier transition to upright posture, but wide-ranging and unstudied sediments of the right age have been found in East Africa, and we have an excellent chance to fill in this part of our story.) What alternative can we suggest to evolution? Would God—for some inscrutable reason, or merely to test our faith—create five species, one after the other (*Australopithecus afarensis*, *A. africanus*, *Homo habilis*, *H. erectus*, and *H. sapiens*), to mimic a continuous trend of evolutionary change?

Or, consider another example with evidence of structurally intermediate stages—the transition from reptiles to mammals. The lower jaw of mammals contains but a single bone, the dentary. Reptiles build their lower jaws of several bones. In perhaps the most fascinating of those quirky changes in function that mark pathways of evolution, the two bones articulating the upper and lower jaws of reptiles migrate to the middle ear and become the malleus and incus (hammer and anvil) of mammals.

Creationists, ignorant of hard evidence in the fossil record, scoff at this tale. How could jaw bones become ear bones, they ask. What happened in between? An animal can't work with a jaw half disarticulated during the stressful time of transition.

The fossil record provides a direct answer. In an excellent series of temporally ordered structural intermediates, the reptilian dentary gets larger and larger, pushing back as the other bones of a reptile's lower jaw decrease in size. We've even found a transitional form with an elegant solution to the problem of remaking jaw bones into ear bones. This creature has a double articulation—one between the two bones that become the mammalian hammer and anvil (the old reptilian joint), and a second between the squamosal and dentary bones (the modern mammalian condition). With this built-in redundancy, the emerging mammals could abandon one connection by moving two bones into the ear, while retaining the second linkage, which becomes the sole articulation of modern mammals.

Third, and most persuasive in its ubiquity, we have the signs of history preserved within every organism, every ecosystem, and every pattern of biogeographic distribution, by those pervasive quirks, oddities, and imperfections that record pathways of historical descent. These evidences are indirect, since we are viewing modern results, not the processes that caused them, but what else can we make of the pervasive pattern? Why does our body, from the bones of our back to the musculature of our belly, display the vestiges of an arrangement better suited for quadrupedal life if we aren't the descendants of four-footed creatures? Why do the plants and animals of the Galapagos so closely resemble, but differ slightly from, the creatures of Ecuador, the nearest bit of land 600 miles to the east, especially when cool oceanic currents and volcanic substrate make the Galapagos such a different environment from Ecuador (thus removing the potential argument that God makes the best creatures for each place, and small differences only reflect a minimal disparity of environments)? The similarities can only mean that Ecuadorian creatures colonized the Galapagos and then diverged by a natural process of evolution.



This method of searching for oddities as vestiges of the past isn't peculiar to evolution, but a common procedure of all historical science. How, for example, do we know that words have histories, and haven't been decreed by some all-knowing committee in Mr. Orwell's bureau of Newspeak? Doesn't the bucolic etymology of so many words testify to a different life style among our ancestors? In this article, I try to "broadcast" some ideas (a mode of sowing seed) in order to counter the most "egregious" of creationist sophistries (the animal *ex grege*, or outside the flock), for which, given the *quid pro*

quo of business, this fine magazine pays me an "emolument" (the fee that millers once received to grind corn).

I don't want to sound like a shrill dogmatist shouting "rally round the flag boys," but biologists have reached a consensus, based on these kinds of data, about the fact of evolution. When honest critics like Irving Kristol misinterpret this agreement, they're either confusing our fruitful consonance about the fact of evolution with our vibrant dissonance about mechanisms of change, or they've misinterpreted part of our admittedly arcane technical literature.

One such misinterpretation has gained sufficient notoriety in the last year that we crave resolution both for its own sake and as an illustration of the frustrating confusion that can arise when scientists aren't clear and when commentators, as a result of hidden agendas, don't listen. Tom Bethell argued in *Harper's* (February 1985) that a group of young taxonomists called pattern cladists have begun to doubt the existence of evolution itself.

Why does our body, from the bones of our back to the muscles of our belly, display vestiges of an arrangement better suited for quadrupedal life if we aren't the descendants of four-footed creatures?

This would be truly astounding news, since cladistics is a powerful method dedicated to reforming classification by using only the branching order of lineages on evolutionary trees ("propinquity of descent" in Darwin's lovely phrase), rather than vague notions of overall similarity in form or function. (For example, in the cladistic system, a lungfish is more closely related to a horse than to a salmon because the common ancestor of lungfish and horse is more recent in time than the link point of the lungfish-horse lineage with the branch leading to modern bony fishes (including salmon).

Cladists use only the order of branching to construct their schemes of relationships; it bothers them not a whit that lungfish and salmon look and work so much alike. Cladism, in other words, is the purest of all genealogical systems for classification, since it works only with closeness of common ancestry in time. How preciously ironic then, that this most rigidly evolutionary of all taxonomic systems should become the subject of such extraordinary misunderstanding—as devised by Bethell, and perpetuated by Kristol when he writes: ". . . many younger biologists (the so-called 'cladists') are persuaded that the differences among species—including those that seem to be closely related—are such as to make the very concept of evolution questionable."

This error arose for the following reason. A small splinter group of cladists (not all of them, as Kristol claims)—"transformed" or "pattern" cladists by their own designation—have adopted what is to me an ill-conceived definition of scientific procedure. They've decided, by misreading Karl Popper's philosophy, that patterns of branching can be established unambiguously as a fact of nature, but that processes causing events of branching, since they can't be observed directly, can't be known with certainty. Therefore, they say, we must talk only of pattern and rigidly exclude all discussion of process (hence "pattern cladistics").

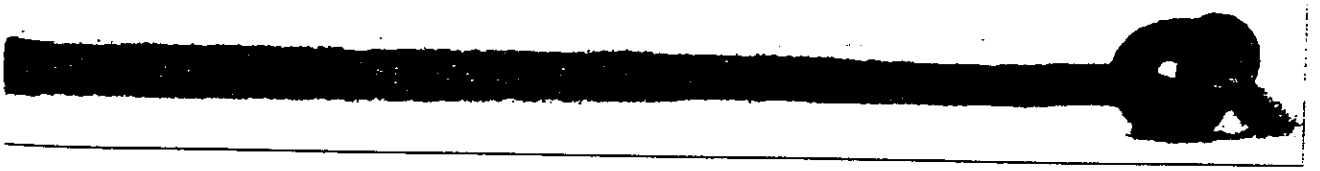
This is where Bethell got everything arse-backwards and began the whole confusion. A philosophical choice to abjure all talk about process isn't the same thing as declaring that no reason for patterns of branching exists. Pattern cladists don't doubt that evolution is the cause behind branching; rather, they've decided that our science shouldn't be discussing causes at all.

Now I happen to think that this philosophy is misguided: in unguarded moments I would even deem it absurd. Science, after all, is fundamentally about process; learning why and how things happen is the soul of our discipline. You can't abandon the search for cause in favor of a dry documentation of pattern. You must take risks of uncertainty in order to probe the deeper questions, rather than stopping with sterile security. You see, now I've blown our cover. We scientists do have our passionate debates—and I've just poured forth an example. But as I wrote earlier, this is a debate about the proper approach to causes, not an argument about whether causes exist, or even whether the cause of branching is evolution or something else. No cladist denies that branching patterns arise by evolution.

This incident also raises the troubling issue of how myths become beliefs through adulterated repetition without proper documentation. Bethell began by misunderstanding pattern cladistics, but at least he reports the movement as a small splinter, and tries to reproduce their arguments. Then Kristol picks up the ball and recasts it as a single sentence of supposed fact—and all cladists have now become doubters of evolution by proclamation. Thus a movement, by fiat, is turned into its opposite—as the purest of all methods for establishing genealogical connections becomes a weapon for denying the mechanism that all biologists accept as the cause of branching on life's tree: evolution itself. Our genealogy hasn't been threatened, but my geniality has almost succumbed.

When I ask myself why the evidence for evolution, so clear to all historical scientists, fails to impress intelligent nonscientists, I must believe that more than simple misinformation lies at the root of our difficulty with a man like Irving Kristol. I believe that the main problem centers upon a restrictive stereotype of scientific method accepted by most non-practitioners as the essential definition of all scientific work.

We learn in high school about *the* scientific method—a cut-and-dried procedure of simplification to essential components, experiment in the controlled situation of a laboratory, prediction and replication. But the sciences of history—not just evolution but a suite of fundamental disciplines ranging from geology, to cosmology, to linguistics—can't operate by this stereotype. We



ESSAY

The common goal of science and religion is our shared struggle for wisdom in all its guises

are charged with explaining events of extraordinary complexity that occur but once in all their details. We try to understand the past, but don't pretend to predict the future. We can't see past processes directly, but learn to infer their operation from preserved results.

Science is a pluralistic enterprise with a rich panoply of methods appropriate for different kinds of problems. Past events of long duration don't lie outside the realm of science because we cannot make them happen in a month within our laboratory. Direct vision isn't the only, or even the usual, method of inference in science. We don't see electrons, or quarks, or chemical bonds, any more than we see small dinosaurs evolve into birds, or India crash into Asia to raise the Himalayas.

William Whewell, the great English philosopher of science during the early nineteenth century, argued that historical science can reach conclusions, as well confirmed as any derived from experiment and replication in laboratories, by a method he called "consilience" (literally "jumping together") of inductions. Since we can't see the past directly or manipulate its events, we must use the different tactic of meeting history's richness head on. We must gather its wondrously varied results and search for a coordinating cause that can make sense of disparate data otherwise isolated and uncoordinated. We must see if a set of results so diverse that no one had ever considered their potential coordination might jump together as the varied products of a single process. Thus plate tectonics can explain magnetic stripes on the sea floor, the rise and later erosion of the Appalachians, the earthquakes of Lisbon and San Francisco, the eruption of Mount St. Helens, the presence of large flightless ground birds only on continents once united as Gondwanaland, and the discovery of fossil coal in Antarctica.

Theologians aren't troubled by the fact of evolution, unless they try to extend their domain beyond its proper border (hubris and territorial expansionism aren't the sins of scientists alone)

Darwin, who understood the different rigor of historical science so well, complained bitterly about those critics who denied scientific status to evolution because they couldn't see it directly or reproduce its historical results in a laboratory. He wrote to Hooker in 1861: "Change of species cannot be directly proved . . . The doctrine must sink or swim according as it groups and explains phenomena. It is really curious how few judge it in this way, which is clearly the right way." And later, in 1868: "This hypothesis may be tested . . . by trying whether it explains several large and independent classes of facts; such as the geological succession of organic beings, their distribution in past and present times, and their mutual affinities and homologies."

If a misunderstanding of the different methods of historical inquiry has impeded the recognition of evolution as a product of science at its best, then a residual fear for our own estate has continued to foster resentment of the fact that our physical bodies have ancient roots in ape-like primates, waddling reptiles, jawless fishes, worm-like invertebrates, and other creatures deemed even lower or more ignoble. Our ancient hopes for human transcendence have yet to make their peace with Darwin's world.

But what challenge can the facts of nature pose to our own decisions about the moral value of our lives? We are what we are, but we interpret the meaning of our heritage as we choose. Science can no more answer the questions of how we ought to live than religion can decree the age of the earth. Honorable and discerning scientists (most of us, I trust) have always understood that the limits to what science can answer also describe the power of its methods in their proper domain. Darwin himself exclaimed that science couldn't touch the problem of evil and similar moral conundrums: "A dog might as well speculate on the mind of Newton. Let each man hope and believe what he can."

There is no warfare between science and religion, never was except as a historical vestige of shifting taxonomic boundaries among disciplines. Theologians haven't been troubled by the fact of evolution, unless they try to extend their own domain beyond its proper border (hubris and territorial expansionism aren't the sins of scientists alone, despite Mr. Kristol's fears). The Reverend Henry Ward Beecher, our greatest orator during Darwin's century, evoked the most quintessential of American metaphors in dismissing the entire subject of conflict between science and religion with a single epithet: "Design by wholesale is grander than design by retail"—or, general laws rather than creation of each item by fiat will satisfy our notion of divinity.

Similarly, most scientists show no hostility to religion. Why should we, since our subject doesn't intersect the concerns of theology? I strongly dispute Kristol's claim that "the current teaching of evolution in our public schools does indeed have an ideological bias against religious belief." Unless at least half my colleagues are inconsistent dunces, there can be—on the most raw and direct empirical grounds—no conflict between science and religion. I know hundreds of scientists who share a conviction about the fact of evolution, and teach it in much the same way. Among these people I note an entire spectrum of religious attitudes—from devout daily prayer and worship to resolute atheism. Either there's no correlation between religious belief and confidence in evolution—or else half these people are fools.

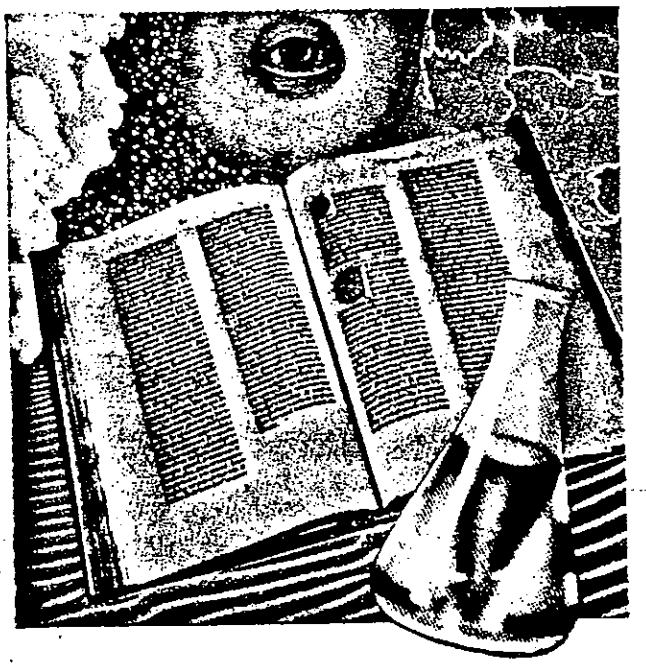
The common goal of science and religion is our shared struggle for wisdom in all its various guises. I know no better illustration of this great unity than a final story about Charles Darwin. This scourge of fundamentalism had a conventional church burial—in Westminster Abbey no less. J. Frederick Bridge, Abbey organist and Oxford don, composed a funeral anthem expecially for the occasion. It may not rank high in the history of music, but it is, as my chorus director opined, a "sweet piece." (I've made what may be the only extant recording of this work, marred only by the voice of yours truly within the bass section.) Bridge selected for his text the finest biblical description of the common aim that will forever motivate both the directors of his building and the inhabitants of the temple of science—wisdom. "Her ways are ways of pleasantness and all her paths are peace" (Proverbs 3:17).

I am only sorry that Dr. Bridge didn't set the very next metaphor about wisdom (Proverbs 3:18), for it describes, with the proper topology of evolution itself, the greatest dream of those who followed the God of Abraham, Isaac, and Jacob: "She is a tree of life to them that lay hold upon her." □

ON EARTH AS IT IS IN HEAVEN

Field trips with the apostles of creation science

By Jack Hitt



"Everyone come this way. Gather around!" shouted Professor John Whitmore above the roar of a swollen creek. Twenty-five undergraduates from his earth-sciences class at Cedarville College bunched up at the edge of a cliff. The field trip to Indian Mound gorge in southwestern Ohio had begun just after lunch. We'd taken a van past spent cornfields. Yellow wildflowers poked up from the brown stubble after days of rain. The hike in was treacherous. Fresh shoots of poison ivy probed the mired path. Already a few girls in fancy shoes were wearing mud slicks up their backs.

"This stratum is known as the Cedarville Dolomite," Whitmore said as students scratched furiously in their pads, "because it is best exposed in Cedarville. Below it you can see a layer of Springfield Dolomite, which would be best exposed in . . . ?" Professor Whitmore paused, inviting an answer. But group dynamics forbade it. The crowd held still, embarrassed, helpless in silence.

"*Springfield*. Exactly," Whitmore answered. The class descended along a rocky path and stopped to draw sketches. A streak of shale appeared, and a gurgling aquifer trickled from the rock, flowing over a smooth limestone tongue. A sweet-faced boy named Jeff with James Dean sideburns fingered the shale and suddenly gripped a loose shard.

"That's a fossil," Professor Whitmore explained, "a crinoid. A nice one too." The preserved animal appeared to be nothing more than an inch of baling string stuck in the shale. The body was neatly segmented into tiny bulbous sections; all in all, in pretty good shape, given that most geologists would date its age at 400 million years.

"It's an echinoderm," Whitmore explained. "It's related to the starfish and the sand dollar." He turned it over in his hand. "I would say it's about 4,500 years old. It was deposited during Noah's Flood."

The students peered over Jeff's shoulder to glimpse his prize before drifting down the path. I hung back with Jeff. He ran his fingers across the tiny bumps of the crinoid body—a souvenir of God's wrath and love cast forever in stone. "Noah's Flood," he murmured.

By now the class was looking upon an enormous chunk of rock that had broken off from the cliff. "And what has caused the rocks to fall is . . . ?"

Jack Hitt is a contributing editor of Harper's Magazine. *"Toxic Dreams," his report from Glen Avon, California, appeared in the July 1995 issue.*

Illustrations by Victoria Kann

Whitmore shouted. His students' stricken faces fell into their notebooks.

"*Gravity*," announced Professor Whitmore, "right."

For the last ten years or so, I have been dipping into creationist literature. Back in the 1980s, the science was unintentional vaudeville. Zealous devotees of murky academic pedigree performed amusing tests and published the results in their own periodicals, such as the *Creation Science Research Quarterly*. One experiment, I recall, involved pouring drinking water from a pitcher into a saltwater aquarium to determine scientifically the effect on saltwater life of what creationists call the "960 consecutive hours" (40 days and nights) of rain during the "Noachian Deluge" (Noah's Flood). The "fish stopped swimming at 20.3 ± 1.1 0/00 salinity," the researcher reported in deadpan science-ese. "Obviously," he concluded with pep, "additional research is needed."

In the last few years, though, creationism has been revived and transformed by an influx of scientists, some with Ivy League degrees, striving to verify the truths of their discipline using the scientific method. They are young: John Whitmore, for example, is thirty-three years old. But more importantly, they are committed: Whitmore completed a study of geology at Kent State University without disturbing his literalist belief in the Bible. Like his cutting-edge colleagues, he now spends his time in the laboratory and on field trips carrying out experiments and carefully weaving together the "physical-world data" and the "Scriptural data," the warp and the woof of what its advocates call "neo-creationism." What emerges from this labor is the taut canvas of a worldview both syncretic and baroque.

Neo-creationism is the work of a small group of scientists, an academic subset situated within "young-earth creationism," the most literal strain of creationist thought. Young-earthers read the Bible as a scientific source document and labor to find evidence of a world created by God in six days about 6,000 years ago. All other creationists, closer to the mainstream, are known as "old-agers"—those who accept most current scientific thinking (including the fact that the universe is billions of years old) but blend it with certain assumptions drawn from the Bible. The most accommodationist old-agers, known as "theistic evolutionists," are little more than latter-day deists; they believe that God kickstarted the universe billions of years ago with the Big Bang and has sat back ever since. "Progressive creationists," a bit farther down the spectrum, believe that God intervenes only rarely, once an aeon or so.

Variations of creationist thought have cropped up since Darwin's day, when it first appeared that scientific progress was going to shove God out of His own universe. For the longest time, those defenders of the faith who didn't want to appear downright antediluvian found themselves struggling to keep up with science, in the process often falling into traps of logic. One strategy, for example, was to find a point where scientific theory was having trouble with a mechanical explanation, and then to argue that it was at precisely *that* mysterious place where God could be found—a position that became known, dismissively, as the God of the Gaps theory. The problem was that every time science progressed, God was forced to retreat to a smaller, more humiliating niche. Among some old-agers, the retreat continues: one subset now holds that God does indeed interfere in the universe, but only at the molecular level, a God of the Gaps position wherein the Lord is on the lam among muons and leptons.

Much of contemporary creationist literature is mere antievolutionism. In 1991 Berkeley law professor Phillip Johnson published the best-selling *Darwin on Trial*. His book exposes the flimsy logic underlying some of evolution's stubborn orthodoxies: How *does* an animal evolve an eye or a wing? Why isn't there any good proof for macroevolution—the transition from, say, primate to man? (Microevolution, which is adaptation within species, is accepted even by the strictest creationists.) Why is there always talk of missing links? All good questions, but Johnson doesn't rely on creationist research to pose them; rather, he plunders the internal debates of evolutionists. For example, Johnson cites a particularly gnarly problem for evolutionists: the massive and rapid appearance of numerous phyla about half a billion years ago, a phenomenon known as the Cambrian explosion. The gradualist idea of evolution is shaken by this moment. But the main popularizer of this flaw is, ironically, creationism's public enemy number one, Stephen Jay Gould, Harvard paleontologist and dispenser of evolutionary doctrine in his monthly column in *Natural History* magazine. Gould long ago put his peers on notice of the Cambrian problem, and then offered a solution known as "punctuated equilibrium." Johnson mentions Gould's solution but dwells on Gould's revelation of the problem. Throughout the book, in fact, Johnson holds up evolution's animated, healthy debate as proof against itself and applies the pitiless rules of logic to a world bright with controversy and contradiction. Ultimately, his book advances no positive theory of creationism; he's just a pissed-off Christian. Imagine the reaction if another sophist had raked through the tissuey pages of the Bible with the same angry rigor.

More recently, some old-agers have floated the "intelligent design," or ID, theory. Drawn from the ancient philosophical position known as "argument from design," ID theory

WHILE MAINSTREAM CREATIONISTS WATER DOWN THEIR FAITH INTO SOUND BITES, YOUNG-EARTHERS ARE CLUTCHING THE BIBLE TO THEIR LAB COATS MORE FERVENTLY THAN EVER

is today's gloss on the position that this intricate universe couldn't have "just happened." It rejects evolutionary science with a commonsense variation on probability theory, arguing that the odds of natural selection producing a world as wondrous and magical as ours are about as likely, as the evolutionary critic Fred Hoyle has put it, as "a hurricane blowing through a junkyard and spontaneously having the luck to put together a Boeing 747."

ID is the theory that has been adopted by those agitating for creationism in the high schools. In their sample textbook, called *Of Pandas and People*, published by the Foundation for Thought and Ethics, the writing is calm and cool. Evolution is dismissed in plain English. Although "God" has been banished from the book, the careful reader can find Him hiding out among the charts and graphs, slipping from chapter to chapter under the nom de Dieu "intelligent designer."

In the 1980s, the Supreme Court stifled the movement to teach creationism in the schools by ruling that the practice would violate the separation of church and state. Now creationists are trying to dodge that bullet by relocating the skirmish from the classroom to the textbook. As creationists become increasingly able to argue that their ideas constitute "just another scientific theory," they will be able to make a first-amendment case with Madisonian gusto: if the evolutionists are so certain they are right, then what do they fear from a rigorous clash of ideas? As *Pandas* concludes, quoting no less an authority than John Scopes himself: "[I]f you limit a teacher to only one side of anything the whole country will eventually have only one thought, be one individual. I believe in teaching every aspect of every problem or theory." This strategy will work beautifully in the he said/she said medium of television, casting Stephen Jay Gould in the demonic role of scowling censor.

Meanwhile, creationist beliefs are inching their way into the mainstream. During the Republican primaries, Pat Buchanan told Sam Donaldson that he favored creationism over "godless evolution," and this summer five Republican state parties wrote platform planks calling for a creationist curriculum. Though the Supreme Court will probably continue to strike down the inclusion of creationism in a formal public-school curriculum, what actually gets taught in a classroom is impossible to monitor from district to district. Once the textbooks are available, the teachers can take over from there. And in many towns, anyway, few parents will complain; 58 percent of Americans believe that it's only fair to teach creationism in the schools.

These trends involve casting creationism's broadest principles into language that will appeal to a mass audience—essentially rewriting God's Word into hollow sound bites that will go down easily on a *Crossfire* episode. The other wing of creationism, meanwhile, is moving in the opposite direction. Instead of secularizing their ideas and watering down their faith, they clutch the Bible to their lab coats more fervently than ever.

Young-earth creationism is built around a central scriptural truth derived from the Bible's genealogy of patriarchs. By counting up the "begat"s in the book of Numbers, a seventeenth-century Irish bishop named James Ussher—perhaps the very first creation scientist—dated the birth of the universe precisely to the year 4004 B.C. (If you perform your own calculations, you will see that 1996 marks the 6,000th anniversary of God's first week of work.) Strict creationists still believe that Ussher's general method is sound, but they are put off by the crackpot exactitude of his math. They prefer twentieth-century scientific notation, and therefore express creation's date as 4121.0 ± 49.7 B.C. By the same math, Christ was born in 3.5 ± 0.5 B.C. and Noah's Flood concluded in 2363.0 ± 44.7 B.C.

According to a handout in Professor Whitmore's class, the two models—creationism and evolutionism—can be considered side by side. One theory holds that creation occurred 6,000 years ago; the other says the Big Bang exploded between eight and twenty billion years ago. Day One of creation gave us "the heavens and the earth"—or the origin of the solar system occurred five billion years ago. Plant life was created two days later—or life emerged on earth 3.8 billion years ago. On the fifth day, animals appeared—or the Cambrian explosion happened 570 million years ago. Man was created that first weekend—or five million years ago, during the late Cenozoic Era, *Homo erectus* developed. Noah's Flood occurred about 4,500 years ago—or modern man stepped forth about 500,000 years ago.

Noah's Flood is central to creationist thinking not only because it is mentioned in the scriptural data but because it provides an explanation for the entire fossil record. Rather than accepting the usual view of trilobites drifting to the bottom of a placid sea to be covered by sediment and then

fossilized, the creationist view is that every fossilized animal died in the carnage of the Flood.

To add indirect proof to this claim, Professor Whitmore took me into his lab, which also serves as the hallway leading to his office. A twenty-foot fiberglass dinosaur—an Acrocanthrosaurus—was taking up much of the space. But the Acrocanthrosaurus was on casters, so we wheeled it by the tail to the other side of the room and stood before a row of a dozen beakers. In each one, a single minnow was rotting. The experiment began several years ago when Whitmore "exposed the minnows to the air until they stopped flopping around." Each container was then marked to indicate a different situation. For example, the label "XNDR" means "no oxygen, distilled water, room temperature." In those beakers open to the air, nothing was left but brown dust. Those with corks ("no oxygen") showed a head in advanced decomposition or a tiny finger of shredded flesh suspended in murky water.

Whitmore explained that this experiment indicates that fish could not have slowly fossilized. Such fish, like his, would rot quickly if exposed to air: if denied air, they would still disarticulate into parts rapidly. And yet so many fossils are preserved whole.

"They had to die catastrophically," he said, "and that catastrophe was the Flood." Those twin conclusions tidily capture the essence of creationism. The physical-world data suggest that most fossilized animals died quickly. An evolutionist who observed this might then set up experiments to determine what caused these fast deaths. But creationists have another bank of data at hand. What catastrophe caused worldwide havoc and could have left a mess of carnage as global as the fossil record? The Flood. No need to experiment further.

One morning I attended one of Whitmore's lectures on basic atmospheric science. He explained ozone depletion in a way that Greenpeace would have found satisfactory. But then he added that we may in the future suffer not a global warming but a "global cooling like the one that took place after the Flood." This slight tangent was little more than a clause embedded in an otherwise straightforward forty-five-minute lecture.

After class, we returned to his lab. When a student entered, I busied myself by examining the Acrocanthrosaurus. A sign attached to it read:

The word "dinosaur" was invented in the 1800s so we don't find that word in our Bibles. However, dinosaurian animals are described in the Bible. Job was familiar with two large animals which may have been dinosaurs. Read descriptions of Behemoth and Leviathan described in chapters 40 and 41 of Job. Dinosaurs coexisted with man. They did not live millions of years ago as evolutionists teach.

Dinosaurs are a big problem for creation science. Since the fossil record is fairly clear that they did exist, and since the scriptural data dates their origin to Day Five, dinosaurs could have ruled the world for only twenty-four hours. Beginning on Day Six, dinosaurs and man must have coexisted in a kind of Flintstonian Epoch. Creationist books now propagate this assertion as simple fact. The Institute for Creation Research in California sells a child's book called *Noah's Ark and the Ararat Adventure*. On its cover is Noah greeting the white dove. Standing near him on board the ark is Tyrannosaurus rex and the eighty-ton Brachiosaurus.

This full embrace of the existence of dinosaurs is a great leap forward from creationism's initial anxious reaction to fossils: that God planted them in the earth to test the faith of believers. Creationists today eagerly poke at the earth with whisk brooms and rock hammers to find confirmation of their own theories. Whitmore once rafted to the extremely remote Liscomb Bone Beds in the Alaskan outback and returned with stunning samples, such as the jaw of a duckbill, all of which are on display in the Cedarville science building. Whitmore explained that he means to inventory his findings and publish the results in a "traditional journal." Dinosaur posters hang on his office wall (and there's that nearly lifesize fiberglass one in the lab). Like all of us, Whitmore thinks dinosaurs are really cool, proof of which is knitted and framed on the wall: I ♥ DINOSAURS. It's just that he also thinks that Noah marched them up the plank two by two.

Whitmore and I were chatting in the lab when a student stopped by to return a book called *Noah's Ark: A Feasibility Study* by John Woodmorappe. Published a few months ago, it represents the most thorough creationist thinking on this singular event. I ordered a copy straightaway.

Using a database and a Bible, the book posits a mechanical answer to any question one could imagine regarding Noah's logistics—and without, as the author boasts, relying on "miraculous Divine intervention." Rather, the scientist's dry hand and calculator compute it all: How many

animals aboard? 7,877 pairs. Weight of animals? A "maximal biomass" of 411 metric tons. Why so few? Noah took genuses, not species. How did big animals, including dinosaurs, fit? Noah took babies. Only "about 11% of the animals on the ark were substantially larger than sheep." What was the "total food dry matter on ark"? A chart explains: "1,990 tons." How much "barn-dried hay"? 21,800 cubic meters. How many sunflower seeds? 7,060 cubic meters' worth. Fresh water? 4,070,000 liters. How much body waste was produced daily? 12 tons. How was it disposed of? Well, you would have to read the three chapters devoted to excrement: "The Accumulation of Excreta, and Vermin Control," "Decomposing Excreta: Odors and Hazardous Gases," and "On-Site Disposal of Manure Through Vermicomposting."

In other chapters the detail is impressive. How did "monophagic folivores," such as the "colobine monkey, three-toed sloth, panda, and koala," eat? It's in there. Other solutions are sublime. How did Noah light an enclosed ark? Torches are a possibility, but then there is all that flammable gas. The author takes note of "an apocryphal account of luminous pearls being used on the ark." But not wanting to veer too far into the miraculous, he tantalizes the reader with a more prosaic theory, which he summarizes in two words: "Consider fireflies."

Eventually, though, the book is exhausting. Each chapter amounts to an impressive collection of could-haves. How did Noah gather all the animals so quickly? Well, he *could have* started a zoo long before the Flood, because "many ancient individuals of renown possessed menageries" such as "the Roman Emperor Trajan." But then, all creationism collapses into a series of could-haves. Even the more erudite works such as Johnson's *Darwin on Trial* amount to scientific could-bes: evolution has problems explaining, say, the absence of transition species in the fossil record, so evolution might be wrong and there *could* be a Designer.

After reading a great deal of creationist literature, one suspects that what annoys creationists is not that evolution refutes the existence of God. What really infuriates them is materialism—the idea that any event can be explained as a process involving physical matter alone. Materialism does not refute God's existence; it just ignores Him. Still, unless creationists plan to reject all the accomplishments of science, they cannot challenge this, its central idea. Materialism has led us to cures of disease, the industrial revolution, flights to the moon—it is, in short, the infrastructure of all progress. To reject it is to reject modernity.

And so creationists take potshots at Stephen Jay Gould and his peers as the evolutionists stumble through their awkward debates at the vanguard of science. But such ridicule is just a variation on the God of the Gaps argument. For now, evolutionists' inability to fully explain the origin of the eye is a convenient target, but if an unassailable explanation were announced tomorrow, evolution's critics would have to retreat and look for the next chink in Science's hardening armor. And who doesn't suspect that one day the slow inexorable chug of reason and observation will provide us with a suitable and elegant description of the development of the wing from the fin? And when that good explanation does come, what language will express this long-held secret—the jargon of engineers or the Word of God?

As part of my research, I listened in for a few months on the CRSnet, a private, ongoing Internet discussion among young-age creation scientists. It's the place where they talk candidly. The discussion rarely sustained a scientific topic for more than a few postings. Often the chats veered into tangential rants about the "lying, death-loving institutes of modern pagan education" or sought examples of how evolutionism led to Nazism.

When the discussion managed to stay on scientific matters, the debates were all efforts to make the conclusions of the Bible flow comfortably from the scientific evidence. During a discussion of dinosaur history, one CRSnet correspondent mused about what T. rex could have eaten in Eden before the Fall, since there was no death and therefore no meat. But then he solved his own problem: "If the time spent in the garden of Eden by all the animals was short (say a few days or 2–3 weeks), the reptiles could have survived without eating flesh. I have observed numerous reptiles going for weeks or months without eating, subsisting on nothing but water." He also added: "You know, I find it interesting that there is no record in the Bible (to my knowledge) of anyone ever getting eaten by a dinosaur."

On another occasion, debate broke out as to when, in the time line of creation, Satan fell. Since God kept declaring each day's work of creation "good," it's hard to squeeze Satan's lapse into that first week. But he had to fall before Adam did, and yet that would put it before creation itself, an impossibility. One writer warned: "When did Satan fall? This is the mistake that a lot of God-fearing men make. Scripture does not say when, so don't even try and attempt trying to find out when he did so. It's fruitless to even pursue something that our LORD and SAVIOUR didn't want us to know or even deal with. GOD bless you bro."

One day my morning download unspooled a running argument about why God created distant light. This issue arises from the apparent contradiction of a 6,000-year-old uni-

LIKE ALL OF US, PROFESSOR WHITMORE THINKS DINOSAURS ARE REALLY COOL. IT'S JUST THAT HE ALSO THINKS NOAH MARCHED THEM UP THE PLANK TWO BY TWO

verse in which light is reaching Earth from stars that are billions of light-years away. Solution: God created that light "in transit." But this tidy solution caused other problems: Does this mean the star emanating the light doesn't exist? Wouldn't this suggest that God was "deceitful"? Another writer claimed he had heard of an "Australian scientist" who had "documented that apparently the speed of light has been slowing down over time since the first measurement. Extrapolating backwards in time, they were able to not only determine that the age of the earth is very young but that at creation light speed was infinite. This would explain a lot of things."

Another theory was proposed: It's possible that "the constellations are a giant billboard in which God tells the story of man's fall and redemption. If it IS a billboard, God would create the stars for the purpose of being seen by mankind." After a few other theories of God's motive were posited (presumably to be tested by experiment later), the conversation drifted on.

My encounters with the newest texts and young creationists seemed incomplete, as did creationism itself. These scientists were frustratingly content to putter around with their ideas but not carry them through to their radical conclusion. How strange to postulate that dinosaurs lived with Noah or that sin is a mutation in our genetic structure or that the forbidden fruit was an addictive hallucinogen or that a fully mature universe appeared *ex nihilo* 6,000 years ago or that extraterrestrials are angels or that the earth literally stopped rotating for a whole day after Joshua's prayer or that Adam lived to be 930 years old—but then not see the larger implications that if these premises are true, then science is in need of a wholesale revolution.

Then I began to hear creationists mention one of their own with an uncommon deference, the kind of friendly awe with which a third-rate literary critic might mention Harold Bloom or a local historian might speak of Stephen Ambrose. One morning a CRSnet correspondent asked his colleagues what had happened to this man, who had "left CRSnet to continue his research." The word was that he intended to gather up creationism's tiny hypotheses and integrate them into a Grand Unified Theory. Creationism, as I found, did have a Stephen Hawking. His name is Kurt Wise, and he conducts his work, appropriately enough, out of Dayton, Tennessee, site of the Scopes Monkey Trial.

On a warm summer morning, I pulled into town and slowed down before the famous courthouse, where a plaque commemorates the 1925 trial. A cast-iron paragraph tells the story of the first modern media circus. The last three words form a sentence that lingers in the ear: "Scopes was convicted."

Up a hill is the little-known William Jennings Bryan College, a few buildings beneath some fat, shady oaks. Kurt Wise, who is the director of the college's Origins Research Department, graduated from the University of Chicago with a geology degree, and then received his Ph.D. from Harvard. Wise once served as a teaching assistant for none other than Stephen Jay Gould, a man he still calls "Steve."

Wise has a number of major research projects under way. In the course of two days, he and I hiked and spelunked through his field sites—including a fossil-filled gorge, an abandoned coal mine, and Tennessee's seventh-largest cave. Wise is a tall, thin guy with neat brown hair and a tidy auburn mustache. His broad face is reminiscent of Bill Gates's, and he wears the same glasses. His laugh is explosive and excessive, like an overeager camp counselor, yet it's charged with a breezy confidence that comes easily to a geologist who has the finest credentials in the world.

Unlike his colleagues, Wise harbors no bitterness toward establishment science. Quite the opposite. Whenever our conversation idled, Wise filled up the dead space with anecdotes that all had the same narrative thrust: Wise subduing an opponent in friendly argument. One was about demolishing an old-age creationist's logic at a particular meeting. On another occasion, he warmly recalled his evolutionary sparring partner at the University of Chicago, who admitted upon graduation that Wise's arguments were unanswerable. Another story featured a professor who forced Wise to write a paper on Jacques Monod's book on randomness, *Chance and Necessity*. "Using Monod's own premises, I arranged them logically such that I proved the existence of God!" he said, and exploded with self-pleased laughter. Wise could not resist the classic Harvard kicker to every anecdote: "I got an A."

As we headed to Arby's for lunch, Wise explained that he was remapping a cave and that his work was leading him to a new theory on cave formation. He loaned me a lantern and helmet, and we set off to explore. By early afternoon we had turned off the main highway and were speeding down an old two-lane macadam into a bright, empty valley off the Cumberland Plateau, a bowl of green except for an occasional farmhouse and some ruminants.

When we pulled up to Grace and Mary Brady's farm, a couple of cows eyed us curiously. The folks know Wise so well that no one bothered to come out as we cut through their property, even though a pen of hunting dogs sent up a chorus of alarm.

Wise was quick with opinions about his chosen specialty, almost all of them surprising. For example, creationists backed a recent bill before the Tennessee legislature that would

WISE CALLS HIS CURRENT PROJECT "THE GREAT SYNTHESIS." IT MAKES STEPHEN HAWKING'S GRAND UNIFIED THEORY LOOK ABOUT AS AMBITIOUS AS A HIGH SCHOOL LITMUS TEST

have criminalized teaching evolution as anything but a "theory." Wise opposed it. He doesn't want politicians mucking around in this issue "until we have an adequate creation-science curriculum." Right now, he said, "we don't."

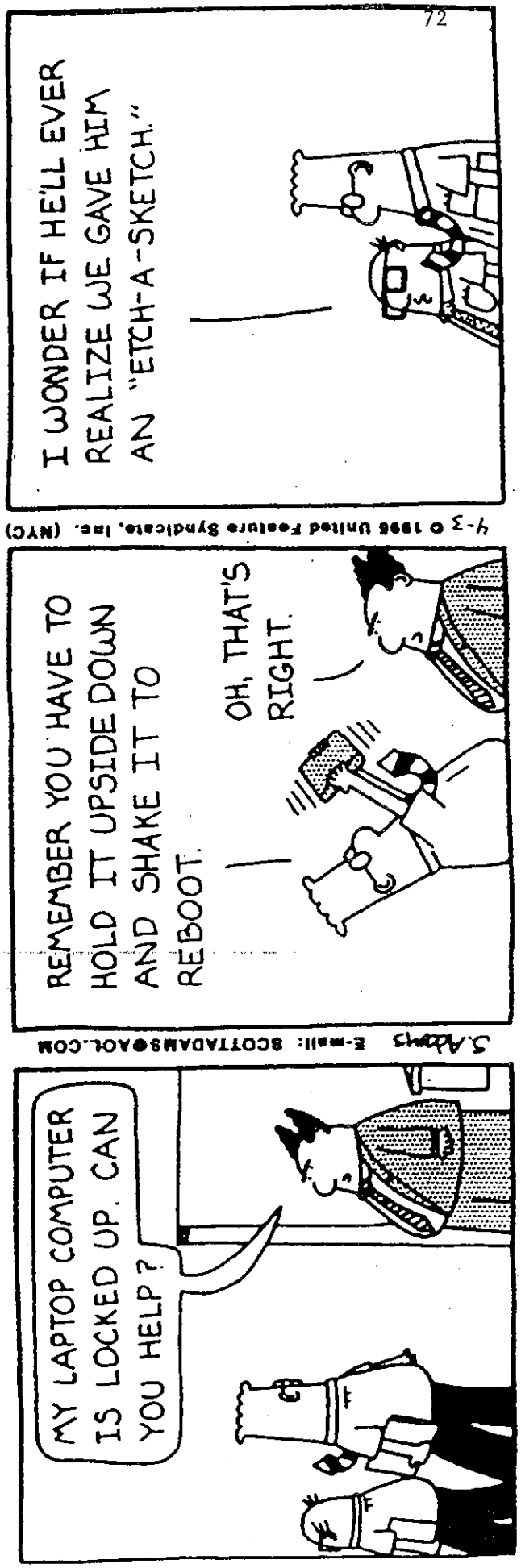
We climbed over a fence and walked along the edge of a towering, cathedral forest. "Most creation science is garbage," he easily admitted. And he just as easily suggested that it was his job to change that. His goal is fairly immodest: he means to undo the Great Divorce—that time after Galileo when theology and science went their separate ways—by serving as the intellectual engine behind his own cosmic theory. He calls it the Great Synthesis. It makes Stephen Hawking's Grand Unified Theory look as ambitious as a high school litmus test. In his own words, Wise intends to use the instruments of science "to restore the Bible to its place at the center of all human thought."

We sidled past a sty whose muddy occupants snuffled cartoonishly. "My idea is not to attack evolution," he said. "My goal is to develop a theory that explains the data of the universe better than conventional theory but is consistent with Scripture." His major beef with other creationists, he explained, is that they only take pleasure in picking at the weaknesses of evolution. "It's a small person who is focused on attacking a theory. By the time I finished at Harvard, I realized I could destroy macroevolutionary theory at will."

We climbed up a rut of clay winding steeply through a hillside forest, laboring against bales of Tennessee heat tumbling toward us. Suddenly the air turned unnaturally frigid and soothing, leading us to a rocky gash cut laterally into the hillside like a pumpkin's frown—the entrance to Grassy Cove Saltpeter Cave. I entered feet-first and slid a bit on my belly until my footing was secure and I could stand up.

"I don't want to *challenge* evolution," he said, his voice echoing in the dark stone chamber. "I intend to replace it."

For the next hour, we journeyed deeper into the cave and further



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along the logical path of Wise's theories. He showed me brachiopods—scallop-like animals—fossilized in the walls. Their random positioning, he said, suggested they were "rapidly buried" by a great churning of energy. Caves, Wise went on, have traditionally been thought either to be eroded by a stream or to involve slow dissolution at the water table level. "But I believe they skipped one possibility," he said. "Piping." Technicians know that when they spot a few drops squeezing through a pinhole in a dam, the process of "piping" has begun and the dam has but a few hours before it is destroyed. The great pressure expands the hole and creates a pipe that continues to grow until the dam explodes before the weight and force of the water behind it.

"The way I see it," he said, "after the Flood, we had an unusual climatic situation. Flood tectonic activity heated up the ocean temperature to about thirty degrees Celsius, worldwide. In the centuries after the Flood, the oceans cooled by evaporating water and precipitating it on land. Some other creationists and I are playing around with the idea of a 'hypercane'—a huge hurricane—bigger than the entire North Atlantic. It stabilized for centuries like the great red spot on Jupiter until the oceans cooled, and then current weather patterns were initiated. The hypercanes dropped enormous amounts of water and created giant lakes. The Great Salt Lake is a remnant of one of those pluvial lakes. A couple of them formed upstream from the Grand Canyon, and then by piping and a catastrophic failure eroded the Grand Canyon in a few weeks. And I think that's when the caves of Tennessee were formed." He went silent. Our headlights ricocheted around the room, spotlighting a stalagmite, a graffito, a piece of fallen ceiling. "*This* cave," he said.

My batteries were waning, my light fading into the advancing darkness. I listened to the echo of his ideas and the peculiar silence of the cave. I had spent days enveloped in the assumptions of creationists, and I began to sense their draw. How comforting it felt to sit cocooned in the cave's cool blackness. I was inside a relic from Noah's Flood. I was inside Jeff's crinoid.

I luxuriated in the strange serenity of Flood geology, a feeling of security tinged with nostalgia. Wise was happy to test out different hypotheses, but they all steered him to a known end. It might or might not be piping, but it was definitely Noah's Flood. The gray irreconcilabilities of science and the phantoms of modern contingency cast no shadow in the absorbing ink of the cave's omnipotent darkness. Here, the most feeble light pointed the way.

I HAD SPENT DAYS ENVELOPED IN CREATIONIST THEORY, AND I BEGAN TO SENSE ITS DRAW. HOW COMFORTING IT FELT TO SIT COCOONED INSIDE A RELIC FROM NOAH'S FLOOD

The spell did not break until several hours later, when I dragged my body out of the cave's bouldered grimace and fell back into the rut and heat of Tennessee clay. In my days with Wise, I heard other arguments, just as ornate and filled with revolutionary deductions, about the formation of the Grand Canyon and Death Valley. In a gorge not far from his office, we sat beside a trickling stream as he retailed a novel theory about plant biology. In an abandoned iron mine, he showed me proof of a new idea about the formation of the earth's crust.

At one point in our talks, back at his office, he explained that he is currently writing a book that will attempt to unify all the new theories of neo-creationism—mainly his own, but some currently being developed by other serious neo-creationists as well. (He said that there are only about two dozen such scientists right now, but he hopes to inspire a new generation.) He tossed me his outline, a seventy-two-page, single-spaced argument laid out in classical style. The grandeur and scope of these pages cannot really be conveyed in the tiny medium of a magazine. It is a rethinking of all of science—every branch—alongside a close reading of the Bible.

Perhaps it is enough to note that Wise hopes to publish his book in a spiral binder so that updates can be popped right in. He is certain that 60 percent of the book will change every six months for the foreseeable future—at least until the scientific research begins to prove Scripture definitely; then it will slow down.

Wise squeaked backward in his chair, spread his long arms and legs into a variation on Leonardo's Man, and laid out his plan. "The Great Synthesis is prenatal, embryonic. First we'll have to develop an epistemology—a philosophy of knowledge—that will tell us how to look at the scriptural and physical-world data. We will need a philosophy of science and a philosophy of philosophy. Then each field of science will be examined in that new light—a new geology, a new paleontology, a new cosmology, a new archaeology, and a new history of the origin of languages, culture, and history. This would include replacing the Linnean classification system."

I asked: "You would need a new taxonomic system?"

"Taxonomy!" he guffawed. "Taxonomy is the paint on the building. I am *rebuilding* the building! But what you name things is critical, because it reflects the concepts that underlie it." Science's ever-branching tree of phylum, order, family, genus, and species, Wise explained, presupposes evolution. Wise believes in discrete "created kinds" (implied in Genesis 1:21), and already a new discipline—"bariminology"—has emerged to reclassify every living thing. "I intend to replace the evolutionary tree with the creationist orchard," Wise said, "separately created, separately planted by God."

Wise is arranging e-mail working groups to reinterpret each branch of the entire world of science alongside

the scriptural data. He paused before another bellow nearly propelled my chair backward into the wall. "It's going to be a long process!"

In time I realized why I liked Wise's laughter. It's honest and beguiling, yet charged with self-awareness. Unlike so many of his colleagues, who look out into the world to see a horizon darkened by pagans and pederasts and high school teachers, he is unafraid of Harvard and Chicago and science's reductionist establishment. He has matriculated through the most prestigious quarters of that world and emerged with his faith unscathed. He quite intends to return—not as a peer but as a conquering hero.

Other creationists rage at a world sinking under the weight of its abominations. Wise believes that science can lift that weight and heal a riven world. He is a modern Adam who quite literally plans to rename all creatures great and small. He wants to restore them to their place in the original Grand Unified Theory, the one that's never been any farther away than the nearest bedside table in every motel.

This recovery means going back, back before postmodernism, before modernism, before naturalism, before romanticism, before humanism, before rationalism, before—well, I asked him precisely how much of human knowledge creationism intended to revise. He replied solemnly, "I'd say everything after, oh, about 3200 B.C." Then another peal of laughter broke, ranging up and down the science hall.

At times, as I listened to Wise's plan for the Great Synthesis, I wanted to ask him if what he was doing wasn't sacrilegious, a modern attempt at Babel: piling all those data atop one another until he arrived at an absolute proof of God. He possesses a faith so certain that he feels it can be proved through science. But what kind of faith is it that can be replaced by proof? In a universe of certainty and knowledge, faith is superfluous. If Wise is successful, who would ever need a leap of faith? We could all walk.

And yet, it is not God's approval Wise seeks (he's convinced he already has it). It's approval from other scientists. Harvard isn't that far behind him. He read me a bilious letter he had recently received from Richard Dawkins, famous evolutionist and author of *The Blind Watchmaker*. Wise pulled it from the top of his desk—it seemed always at the ready—and snapped it open like a town crier.

"I have gone on record saying," Wise recited, "that anybody who holds such beliefs, like anybody who thinks the earth is flat, is either a fool, a knave, or an ignoramus. I am told that you are neither a fool nor an ignoramus." He set down the letter. His laughter had fled. His eyes shrank to pinholes and his face fattened with blood. He stared past me. "That leaves knave."

Like every scientist, Kurt Wise longs for the respect of his peers. But he knows he is, at best, loathed by them—or, worse, ignored. On the way home from the cave, he opened up a bit, revealing just how difficult it is to be Kurt Wise, Ph.D. from Harvard cum creation scientist at WBJ College.

"Do you think I *chose* this?" he asked plaintively. "I don't want to be ostracized. But I have committed professional suicide. It would have been so much easier if I just said the earth was old." He clutched the wheel tight with both hands. The car heaved up the side of a limestone mountain. The entire Tennessee Valley appeared before us.

"I was trained by the leading paleontologists at Chicago and Harvard. Don't you think I could get a good position that could pay my bills instead of where I am? It would be so much easier to go to a conference and not be laughed at, so much nicer to not be pointed at, and not have every argument I make held to standards that are ten times higher than everyone else's. I have watched classmates who were not very smart get important positions. Do you think that's easy? All I would have had to do was say I believe in an old earth." He pulled the car over to a scenic view where the horizon was about fifteen miles away. "But it's just not true."

I was suddenly reminded of one of

Cambrian Extinction Tied to Continent Shifts

Scientists at the California Institute of Technology have put forth a novel explanation for the rapid diversification of life that began 530 million years ago and resulted in all of the animal phyla living today.

In the July 25 issue of *Science*, the researchers contend that a major reorientation of the earth's tectonic plates produced a rapid movement of continents that led to repeated changes in oceanic circulation patterns. These, in turn, disrupted regional ecosystems, forcing evolution to proceed nearly 20 times as fast as normal.

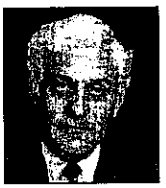
"Life diversified like crazy about half a billion years ago, and nobody knows why," said Joseph L. Kirschvink, who headed the study. "The geophysical evidence that we've collected from rocks deposited before, during, and after this event demonstrate that all of the major continents experienced a burst of motion during the same interval of time."

The scientists said the rocks' magnetic minerals, which align themselves with the earth's magnetic field, show that the axis of the earth rotated by nearly 90 degrees during this geological period, known as the Cambrian. They contend that a major reorganization of tectonic plates triggered this reorientation, putting regions previously at the North and South Poles at the equator, and forcing continents to move at rates hundreds of times faster. —KIM A. McDONALD

DR. RAYMOND V. DAMADIAN JOINS TECHNICAL ADVISORY BOARD

ICR is pleased to announce the appointment of Dr. Raymond V. Damadian to its Technical Advisory Board.

Dr. Damadian has many accomplishments to his credit, but is best known for inventing the Magnetic Resonance Scanning and Imaging medical diagnostic tool, best known as the "MRI." Less well-known is the fact that he is a witnessing Christian and creationist, and longtime advocate of ICR and its materials.



Dr. Damadian graduated from the Albert Einstein College of Medicine in 1960 after having given up a promising career in music and later as a tennis pro. Later that year, he married the former Donna Terry. From the first he was more oriented toward the technical side of medicine, and after many years of shoestring budgets and poorly equipped laboratories, he received the patent for the MRI in 1974.

Raised in a Christian home, Dr. Damadian lost interest in spiritual things throughout his training and early professional life, being influenced by his heavily evolutionary training into believing that God was disinterested and that the Bible could not be trusted. Meanwhile his godly wife continued to pray. Eventually, he was introduced to the writings of ICR Founder, Dr. Henry Morris, and the research of ICR, and a dramatic turnaround ensued.

Dostoevsky's long-suffering characters (I can't remember which) who cries out in one of the novels about how happy he would be if he were an old peasant woman, toiling each day in the fields, confident in her God. How strange it felt to sit beside quite possibly the only man in Christendom pining for existential doubt.

Wise rolled down his window and showed me the Appalachian Mountains in the distance. He explained how the Flood must have sheared off their tops. And how the receding waters had deposited an enormous wedge of topsoil in the Tennessee Valley. And how it had to be that a giant lake a thousand feet deep formed before it collapsed catastrophically to carve out the valley and create the Chattanooga River.

"Right out there," he said, and pointed into an endless empty vista. I looked upon a scene of broad and easy dimension. From this high outcropping, the human scale is obliterated by distance. The view is wide and deep: the big picture. I can block out the entire range of the Appalachians with my thumbnail. The only perspective more grand and expansive is God's alone.

I felt again the warmth of believing that for every inch of infinity there has already been an accounting. Everything has a reason for being where it is. Every fossil situated out of its normal orientation, every mountain peak, every anfractuous cave, every silted delta, every meandering river valley, every sheered tectonic plate studied through the lens of scriptural inerrancy (and tested by scientific theory) reveals its place in a knowable past and future—all linked, I realized at last, by a sense of purpose. That was the source of nostalgia. I had felt it before, in childhood, when everything around me radiated with specific meaning and parental clarity. That, after all, is what all creationists feel that evolution has stolen from them. Yet only Wise—and quite possibly he alone—has dared to follow the honest logic of creationism's view out to its end. He is a man whose pure faith and fine intellect are woven so tightly together that he can find no ordinary perch from which to view the gathering evidence of human knowledge. He would have to go back to where Moses went, to the mountaintop, back to the beginning, and rewrite the world.

As he talked on, all the difficulties of modern science disappeared. Chaos exerted no influence up here. Complexity theory was far away. Random evolution, meaningless mutations, trial and error (mostly error), aimless procreation, the pointless void of space, the cold materialism of Darwin's damn theory bereft of the tiniest significance—all had fled before the soothing unity of synthesis and the restoration of purpose to a fallen world.

I would have liked to sit up there forever. ■

November Index Sources

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Scientists find clues for ancestral "Adam"

DNA marker traces single ancestor back about 180,000 years.

BY JOHN NOBLE WILFORD
THE NEW YORK TIMES

In new genetic studies of modern human origins, scientists think they have found strong evidence that there was an ancestral "Adam" about 188,000 years ago to go with the previously discovered "Eve."

The scientists used certain male-specific segments of the Y chromosome, the chromosome passed from father to son, to trace the common ancestor of every man now on Earth to that period. They are reporting the findings today in the journal Nature, which also includes a separate study that places Adam in a more recent time.

Earlier analysis of the DNA of the mitochondria, the tiny structures within each cell that generate its energy and that are transmitted only by the mother, indicated that all humans have as a common ancestor one woman who lived in Africa about 200,000 years ago — and inevitably has been stuck with the name Eve. All human mitochondrial DNA that now exists, it seemed, derived from a single ancestral mitochondrial molecule from that place and time.

In the quest to read the evolu-

Please see **Adam,** *Page* **A12**

Adam: Ancestor alive 188,000 years ago

Continued from Page A1

tionary history written in human genes, a corresponding Adam has been harder to track down. A report earlier this year by scientists at Yale University and other institutions concluded that modern Homo sapiens could have descended from a small group of male ancestors who lived about 270,000 years ago, since revised to an estimate of 160,000 to 180,000 years.

Scientists at the University of Arizona in Tucson and Cambridge University in England are now reporting new and possibly more definitive evidence for the date of the Y chromosome Adam.

In one report, Dr. Michael F. Hammer, a research scientist at Arizona, estimated the time back to a common ancestral human Y chromosome to be 188,000 years, reasonably close to the time for the common mitochondrial ancestor.

Many males were around at the time, but only one left a Y chromosome legacy that persists today.

Likewise, many females were living at the time of the woman whose mitochondrial DNA was ancestral to all people today.

The two could have lived at slightly different times, and it is somewhat misleading to associate them with the biblical Adam and Eve, who were supposedly the ultimate sources of all humans. Rather, they were probably two random individuals in the small population of early humans, some of whose genes happen to have persisted in the lottery of procreation while those of their contemporaries failed to survive.

The continent where this ancestor lived has not been determined, Hammer said, though some further research not yet published pointed to an African origin.

In the other Nature report, L. Simon Whitfield, a graduate student in genetics at Cambridge, described research showing a more recent time for the common Y chromosome ancestor — 37,000 to 49,000 years ago. The difference in dates between the Arizona and Cambridge research, scientists said, could be the result of a much smaller study sample in the Cambridge research, as well as differences in the type of DNA analysis and in assumptions made about mutation rates and human populations in such an early time.

Hammer and other specialists in genetic studies of human origins said the new research supported the hypothesis that anatomically modern Homo sapiens evolved in Africa and then spread out through Asia and Europe, replacing more archaic Homo species. In particular, they said, the results suggested a single place of origin for modern humans.

SCIENCE

Doubting Darwin

Biblical creationists could learn a lesson from Darwinists

BY FORREST M. MIMS III

What is evolution? Does it simply mean that plants and animals can adapt to changing circumstances? Or does it mean birds descend from dinosaurs and people from apes?

Did life arise spontaneously when clusters of molecules somehow devised ways to increase their complexity and to reproduce their kind? If so, where is a role for God in any of this?

John Wiester, a science instructor at Biola University and Westmont College and chairman of the Science Education Commission of the American Scientific Affiliation, has been asking questions like these for more than a decade. Mr. Wiester is especially concerned by what students are taught about evolution. "What we're talking about here is Darwinian fundamentalism," he observes. "The Darwinists teach their ideology—that we are the result of purposeless, accidental forces—as science. This is a tragedy for authentic science and rational thought."

A good example of ideology posing as science is the tale of *Biston betularia*, more commonly known as the peppered moth of Birmingham, England. Prior to 1850 most of these moths were light in color with a sprinkle of dark spots and stripes. Only a few were entirely black. As smoke from industry coated the buildings and trunks of trees around Birmingham with a layer of dark soot, the number of dark moths gradually increased. By the turn of the century virtually all the moths were dark.

Darwinists have long hailed this dramatic change in the peppered moth as a spectacular example of evolution in action. Photographs of both versions of the moth were widely published in high school and university biology textbooks. The late Isaac Asimov's *New Guide to Science* used the little moth as proof for the entire theory of evolution. Thus, the same theory that describes the color change in the moth somehow explains the origin of its precisely designed brain, eyes, wings, and even the DNA in its cells.

But there's more to this story. The color change in peppered moths occurred after birds could easily find the light versions perched on soot-coated tree trunks and buildings. Consequently the formerly rare dark versions became dominant. Over the past few decades, however, changes in industry and clean air laws have significantly improved the quality of the air around Birmingham. As buildings and tree trunks lost their coating of soot, the pale version of the peppered moth returned.

Textbooks still proclaim the peppered moth a classic example of Darwinian evolution. But the moth never evolved into a cricket, dragonfly, or even a butterfly. Instead, it demonstrates a superb, cleverly designed ability to adapt to changes in its environment. This ability is shared by countless other organisms, ranging from bacteria to people. Yet Darwinists would have us believe that adaptation proves that the various kinds of life arose from simpler forms and that our ultimate ancestors were little different from modern bacteria.

For thousands of years people have conducted a massive experiment in speeding up the evolutionary process by artificially manipulating the reproduction of domestic animals and plants. These experiments have conclusively shown that there are definite limits to change. Cats remain cats, dogs remain dogs, and neither has evolved hooves, antlers, or feathers.

Darwinists would have us believe that adaptation proves that the various kinds of life arose from simpler forms and that our ultimate ancestors were little different from modern bacteria.

To their credit, some evolutionists have tackled this and other problems with Darwinism, such as the tendency for most forms of life to remain stable through vast epochs of time. But others have vigorously attacked those who would question the fundamentals of Darwinism as unqualified, ignorant, or worse. When professional scientists ask why evolutionism is considered the underlying theme that unifies all biology, they are either ignored or castigated as pseudoscientists or religious fundamentalists.

Phillip E. Johnson, professor of law at the University of California's Boalt Hall School of Law, once watched all this from the sidelines. Mr. Johnson was particularly interested in the underlying agendas of Darwinism. And he was concerned by the methods Darwinists use to advance their agenda—the bashing of creationists, the firing of teachers, the censoring of books, and the intellectual dishonesty inherent throughout Darwinism.

In 1991, Mr. Johnson wrote *Darwin on Trial*, a carefully crafted exposé of the philosophical underpinnings of evolutionary dogma. Evolutionary scientists were outraged that a non-scientist, especially an intelligent and articulate professor of law at a distinguished institution, would dare to confront them on their own turf. But their sometimes vicious attacks simply bounced off the unflappable professor, who began giving lectures on Darwinism around the country. Johnson's book is now required reading in some college courses, including one taught by an atheist. And Alabama has just distributed 900 copies of the book to science teachers in that state.

Where is the church in all of this? Only a few denominations publish serious literature on what was once considered one of the most obvious tenets of faith: that God created this universe and the life within it. Organizations like the Institute for Creation Research have labored to provide a scientific approach to origins. Founded by hydrologist Henry Morris and staffed by professional scientists, ICR played a major role in exposing the flaws of evolutionism in numerous debates with Darwinists. But ICR's belief in a young age for Earth has caused clashes with other Christians who, while rejecting Darwinism, believe the Earth is much older.

Thinkers like John Wiester and Phillip Johnson seem to recognize that Christians on both sides of the debate over the age of the Earth have infinitely more in common with one another than with the Darwinists. In this development is hope there may soon be a unified, rational response. The Darwinists vigorously debate and even castigate one another in the privacy of their journals and conferences. But they present a unified front against any notion that a Creator designed both them and the life forms they study. In times like these, this may be the single most important lesson that advocates of Creation can learn from the Darwinists. ⊕

Science, religion still at odds,
70 years after Scopes trial

By Lee Hollaway

NASHVILLE, Tenn. (BP)--A noted creationist opposed the teaching of creationism in public schools, while a biologist-evolutionist favored it, in a symposium marking the 70th anniversary of the Scopes trial.

Kurt Wise, a self-described "young-age creationist" who teaches science at William Jennings Bryan College, Dayton, Tenn., expressed reservations about offering such instruction in public schools, saying curriculum materials currently available are not of sufficient quality. He also said it would be inappropriate for creationism to be taught by teachers who, in most cases, are evolutionists.

William Provine supported the teaching creationism for two reasons: "The majority of students are some kind of creationist, and they are now disenfranchised by having it excluded from the curriculum." And, he said, "the evolution position is weakened by not having opposing views presented." Provine is a professor of biological sciences at Cornell University, Ithaca, N.Y.

Wise and Provine were among participants in the Nov. 1-3 "Religion and Public Life: Seventy Years after the Scopes Trial" at Vanderbilt University, Nashville, Tenn.

Setting the tone for the discussion which followed, Madeleine Goodman, dean of Vanderbilt's college of arts and science, welcomed the symposium as an opportunity to "revisit the broader issues of science and religion" raised by the Scopes trial.

In 1925, high school teacher John Scopes was tried and convicted of violating a Tennessee law against teaching evolution in public schools. The case received national attention when Scopes was defended by prominent attorney Clarence Darrow, while the state's position was pressed by William Jennings Bryan. The trial was the first ever to be broadcast live on radio.

While clearly supporting the Darwinian worldview, Goodman acknowledged that embracing this theory still requires a leap of faith. Other speakers at the conference agreed that a "leap of faith" was required by advocates of either science or religion.

Provine argued, however, that the leaps were of different sizes. "Belief in the virgin birth and the resurrection of Jesus requires a huge leap," he contended, compared to that required for a scientist to assume that the world operates according to naturalistic laws.

Provine described his personal pilgrimage from being raised in a religious family in the South to becoming a disciple of Darwinian evolution. As a young person, he said, "I believed that I was part of a cosmic process charged with meaning." He said he could find no purpose or design within evolution, however, and that absence of design helped to undercut his belief in God.

Provine also pointed out "the evolutionary perspective provides no ultimate foundation for ethics." For him, that meant having to "wrestle" his way to his own moral and ethical positions.

Panelist Wallace Charles Smith, pastor of Shiloh Baptist Church, an African American congregation in Washington, said African Americans have tended to shy away from the science-religion debate. They accept many teachings of science, he said, but not "the sacralization of science." They also are suspicious of the "calcified" positions of some religious extremists.

The worldview of many African Americans is one that is more complete, with God present in every aspect of it, Smith added.

Wise acknowledged a wide range of opinions exist within the religious community on the subject of creation. The vast majority -- perhaps 95 percent -- he characterized as "concerned consumers" who have received and accepted secondhand information about creation but are more concerned with basic life issues. A vocal minority of perhaps 4 percent, whom he called "crusaders," are highly political debaters who try to change the public school textbooks. The remaining 1 percent he described as "model builders," mostly academic scientists and philosophers who encourage a continuing dialogue with the evolutionist community. Wise placed himself within this group.

Baptist Press 11-7-95

THE WORLD AND I, July 1987. A Buddish scientist who rejects evolution as bankrupt. He has been dismissed as being "religious."

SCIENCE AND THE DIVINE ORIGIN OF LIFE

Astronomer N. Chandra Wickramasinghe explains why statistics preclude a materialistic origin of life.

ROY ABRAHAM VARGHESE

N. Chandra Wickramasinghe is professor and department chairman of applied mathematics and astronomy at the University College of Cardiff, Wales. Books he has written include Solid State Physics *(with D.J. Morgan, 1975),* Fundamental Studies and the Future of Science *(1984),* Evolution from Space *(with Fred Hoyle, 1984), and* Living Comets *(1985). The author conducted this interview at Wickramasinghe's home in Cardiff. —Ed.*

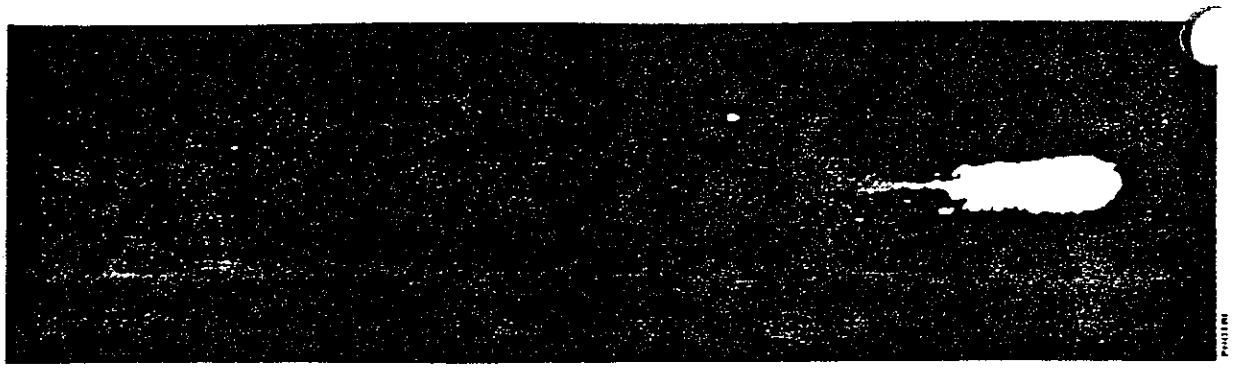
Could you give a brief account of the work you did along with Sir Fred Hoyle on the "Origin of Life" and of the main conclusions you reached in your work?

This work really began some twenty years ago when we had set out to understand the composition and the chemical make-up of tiny dust grains that are known to be present in space in really vast quantities. At the time that we started research into this matter, the general belief was that these dust particles, which show up as patches of obscuration in the Milky Way, are made up of tiny ice grains, rather similar to the ice grains that one sees in the cumulus clouds in the atmosphere of the earth. But it was clear from the start of our investigation that this particular theory of the grains could not be right. It did not fit the data. And we found, on the other hand, that particles of carbonaceous character came much nearer in producing all the observed effects. So that was the first step: unravelling the nature of the dust particles. We found that they were not ice as astronomers had felt them to be, but particles that had a large carbon content.

The research work from that time on had been to focus on the nature of the carbonaceous material in the dust grains. This was a long, tedious process lasting many years. It was only about five years ago that we realized that the dust had to be not merely carbon, not simply carbonaceous, but it had to be biological in character. There was no other way to explain a whole lot of astronomical data except to say that the dust grains in space had essentially to be connected with life. And the marvelous agreement that we obtained with the astronomical data on how starlight is blacked out by dust clouds and so on gave us great confidence that this had to be correct.

We next looked at the conventional story of how life originated on the earth. This had been around for a good many years, the general belief that life has to originate on the surface of our planet from some kind of primordial soup which developed in the very early days of the earth's history. Now, if you think about this proposition, there is no logic that demands this to be so. We know that the universe is very much older than the earth and there is no absolute requirement to have life start on the earth.

But even assuming that one had some reason to limit one's scope and to say that life had to start on the earth, then it was possible to look into the usual arguments. We did this rather carefully, and we



Comets are known from spectroscopic analysis to contain large amounts of organic material. Wickramasinghe proposes that these may have been a source of the precursors of life on earth.

found that all the conditions were wrong for life to start on the earth. The atmosphere of the earth was supposed to be of a character that permitted the formation of complex organic materials, according to the conventional story, and our investigations revealed to us that the earth's atmosphere could not have had this character.

In technical language, a necessary requirement for organic soups to form on the earth is that the early earth's atmosphere has to be reducing, that is to say it has to have a deficit of oxygen, of free oxygen atoms. If we look at the earth's atmosphere right at the present moment it's certainly not reducing. It's full of oxygen. Anything that lies around essentially rusts. Dead organic materials lying around no more than a few weeks, a few months, become essentially converted to carbon dioxide; it's very rapidly oxidized.

One of the earliest questions that was raised in connection with the primordial soup was deciding whether at any early stage in the earth's history, there was a situation when the earth's atmosphere was not of its present character, that is, it was reducing rather than oxidizing. We looked at this rather carefully, and we decided that the earth's atmosphere was never of the right character to form an organic soup. We came to this conclusion about three or four years ago, and we published this in a book under the title of *Lifecloud*.

At the time that this book was published, the idea that the earth did not have the right atmosphere offended lots of people. But, at the moment, in 1983, it's almost taken for granted in the scientific community that the earth's atmosphere could not have been reducing. Geochemists and geologists have now come around; they now say that the primordial soup had to be imported from the outside. The comets and meteorites, and so on, landing on the earth had to bring the organic soup and so that's going part of the way. In *Lifecloud*, we said that the organic soup theory could not be right. There's no way it could have developed upon the earth. Comets and astronomical objects do have organic material in large quantities. That's what we said in the first book. The general belief now is that at least part of that has to be true. The earth could not have produced an organic soup on its own.

The organic soup itself is not such a marvelous thing. It is a prerequisite for any biological activity to start; that's certainly true. But it doesn't follow that if you have an organic soup it could get life started. It doesn't follow logically that one can start from an organic soup and end up with a living system. There's no logic that drives you to that conclusion at all. And when we looked at the probabilities of the assembly of organic materials into a living system, it turns out that the improbabilities are really horrendous, horrific in extent and I concluded along with my colleague that this could not have happened spontaneously on the earth.

There's not enough time, there aren't enough resources and there's no way in which that could have happened on the earth. If it could have happened easily, then I think it's also fair to say that scientists who've been bashing away at laboratory experiments for twenty or thirty years would have come somewhere close to a complex organization; such may not be exactly life but would have appeared to converge towards life. They conducted experiments in the lab with test tubes, with flasks and

organic soups contrived in the labs. If there was any truth in the statement that life can start in this way, then I think one could make a very strong case for saying that it should have happened in the lab already. The fact that the lab experiment, the flask, is only one part in 10^{15} or 10^{20} of the earth's oceans is not a very important consideration. Given the enormous information content that you need for life, the scaling down factor is unimportant. If you say this business happened on the earth in a billion years and that you have only done this for three years in the lab, then you can perhaps have another factor of a billion that might appear to be a credible way out of this dilemma. This is the usual stance scientists have adopted, to say give us more time, not a billion years, maybe 10 years. That's the usual story, but again, if you look at the extent of information that needs to be put together, a factor of a billion in time or a factor of a trillion in spatial volume, in the volume of the oceans relative to the volume of the flask is completely immaterial. Because what one has to really develop is an information content that is measured in ten followed by 40,000 zeros, $10^{40,000}$. So if you divide that then to the power 40,000 by a factor of 10 to the power of nine for a billion and further 10 to the 15th or 10 to the 16th for the size of the oceans, you still end up with an enormous factor, an enormous number. If you divide $10^{40,000}$ you still end up with $10^{39,000}$ or more, a vast number. So, in one year, in a single test tube we should be generating a system that approaches life. That's a very hard fact that one has to face. If there's any way that one could justify the usual claims, every time you spark a test-tube with organic nutrients, you will be seeing, I mean not exactly life, you would be seeing a progression towards a living system or a quasi-living system, and that has not been found to be true at all. What you get is an absolute mess of polymers, of uninteresting polymers and some of the polymers do contain nucleic acids, residues, amino acids and so on, but that's beside the point. It doesn't come anywhere near the structure of life here. So that's the main point.

VINCE HOPKINS

Professor Wickramasinghe: "The earth's atmosphere was never of the right character to form an organic soup."

To recapitulate, from the point of view of an astronomer, looking at the evidence of astronomy, life is everywhere around us, at the level of microscopic life (microorganisms and genetic fragments around us in vast quantities throughout the universe). And from the point of view of geo-chemistry and terrestrial experiments, if you look at the early earth as a possible site for manufacturing life, it turns out that the case is non-existent, I would say, for such a thing happening on the earth.

The next point that one has to worry about is to consider where the cosmic life arose from. Having seen it around on the earth in the form of large creatures and in the universe in the form of microscopic particles, one has naturally to ask the further question when and where this complex organization of happenings arose. And I think, at that point, I would give in to the theological answer, in the sense that I cannot claim that I have an answer. All that I am sure about is that life could not have happened on the earth spontaneously.

Then the further investigation that we did over the past two to three years is to decide whether evolution of life on the earth could have proceeded in the way that biologists have told us it happened, for a couple of generations now. And it's again a rather amazing conclusion that we reached. We found that there's just no way it could happen. If you start with a simple microorganism no matter how it arose on the earth, primordial soup or otherwise, then if you just have that single organizational, informational unit and you said that you copied this sequentially time and time again, the question is: Does that accumulate enough copying errors, enough mistakes in copying, and do these accumulations of copying errors lead to the diversity of living forms that one sees on the earth? That's the general, usual formulation of the theory of evolution. In making copies, either sexually or asexually, you pile up errors in

copying. And the natural environment selects the best fitted for survival out of the very many genotypes that have developed through the accumulation of mistakes. It's been claimed that the combination of the mistakes and the selection leads to the steady evolution of life.

We looked at this quite systematically, quite carefully, in numerical terms. Checking all the numbers, rates of mutation and so on, we decided that there is no way in which that could even marginally approach the truth. On the contrary, any organized living system that developed or emerged say in the form of a microbe, four billion years ago, if it was allowed to copy itself time and time again, it would have destroyed itself essentially. The pileup of copying errors could have two effects: (1) It could improve the genotype for survival, or (2) it could decrease the survival characteristics of this particular living form. If you consider the balance between the two effects it turns out that it's always the destructive component that wins. For every favorable mutation there will be hundreds of unfavorable mutations. So it has to be a steady downward procedure. If we start with a highly organized system of a lot of information and if you are copying, it has to ultimately decline and degenerate.

The way out of this is to suppose that natural selection operates, not in relation to the copying errors, but in relation to continual inputs of new information that organisms could imbibe from the outside world. Now, we know that viruses and fragments of viruses could get into cells of all creatures, of all plants and animals. Viral components could add on to the genomes of existing animals and we argued that this is the only way in which one could keep the evolution going essentially —that is, where the new information for new creatures, for new life forms, for new attributes, must be injected from the general pool of cosmic life around us.

Could you be a little more specific on what exactly you mean by that?

If you look at the fossil record, then you see instantly that the present-day living forms have a whole range of structures and types, from microorganisms all the way up to human beings and, later on, if you get back in time, if you go deeper and deeper into the geological strata, there appears to be a progressive decline of the more complicated and more sophisticated life forms. The human eye, monkeys and apes are fairly recent in the geolo deposits compared to dinosaurs. The whole range of living forms becomes progressively less complicated, as you go down in the geological strata. So there is a very strong indication of a sort of evolution that has occurred. The earliest life forms are simple and the later life forms become more varied, more complicated, more complex. How is this pattern to be explained in the face of the arguments that I have outlined to you, where any tendency is for mutations to accumulate in a closed system. If biology is a closed system, then it seems to me that mutations degenerate in the life forms that exist at any given time. I think the way out of it is to suppose that instructions for more sophisticated life forms, for the continual evolution of life, has to be supplied from outside the earth.

By some higher intelligence?

Yes.

Would this in some way solve the problem of the missing link, of the missing transitional forms, which I have understood to be one of the major flaws in most evolutionary theories?

Yes, transitional forms have never been discovered. Between the most important groups of creatures with major differences in attributes, transitional forms have never been discovered in the fossil records. I think that is a major defect in the conventional theories because the transitional forms, likely to be the most important, should have been sufficiently long-lived. If things move very slowly then should have been some record.

It surprises me that many notable scientists have not paid sufficient attention to this problem. What was their response to your work?

I don't really know. I think they turned a blind eye to anything that doesn't tie up with their, essentially, theology. There's no evidence for any of the basic tenets of Darwinian evolution. I don't believe that there ever was any evidence for it. It was a social force that took over the world in 1860, and I think it has been a disaster for science ever since.

This is a sociological question, but do you see it as still prevalent in the academic world?

I think it's prevalent in the scientific, academic community to this extent: it's very similar to the situation before Copernicus, when a very complicated system, the Ptolemaic system, was maintained as being the correct one.

And they tried to explain all the new discoveries within the framework of the old system?

It's exactly what one sees in modern evolutionary biology; there's an exact parallel. There is very considerable competence in the use of electron microscopes and very competent DNA techniques. And there's very powerful, experimental backup for modern biology. But they have the wrong theory. With extremely sophisticated equipment they have discovered a lot of fine details in biology that they try to force into a wrong theory, and whenever there is a mismatch, they introduce new hypotheses. It's like the Ptolemaic system, cycles and epicycles.

You have encountered some of the most prominent evolutionists today like Stephen Jay Gould. How would you assess them?

They're all very arrogant, dogmatic people (I'm not referring to any one particular person); they hold absolutely tenaciously to a point of view which has become a theological issue. Whenever there's a clash between a theological attitude and a scientific attitude then the theological attitude takes precedence because it has a lot of social or sociological backup.

How did Gould respond to the problems you pointed out?

He just shrugs his shoulders and says that there's a lot of things we don't understand. There's a lot of vagueness everywhere. They are deeply uncomfortable. They are deeply threatened by the weight of evidence.

There's another problem that one faces in modern science. It's so highly compartmentalized. Evolutionary biologists don't understand physics, they don't understand anything but evolutionary biology. But the universe doesn't respect the boundaries between different disciplines. The differences between biology and astronomy and chemistry and so on, these are man-made artifacts of thinking. I think the whole system is doomed unless one decides that all these barriers are cleared. And I will go further to say that even the interface between theology and the other disciplines is necessary.

Could the universe be infinite in terms of space and time?

Well, I think that the astronomical evidence now is against that. There doesn't seem to be such a universe that has an extended, open time-scale. So under those circumstances, I think one is driven again to postulate an intelligence. The logically easiest way of beating the improbability is to say that an intelligence intervened. If you see that life or patterns of anything are too complicated for emergence in a random way, like the arrangement of items in this house, then the obvious conclusion that one is led to draw from this datum is that there has been an intelligence behind the design of the house. In a similar way, one could make the same statement for the living system.

If the universe is not infinite in size and time-scale, then is one forced to conclude there is a higher intelligence, not merely as a possible option, since this would rule out the possibility of an accident?

I would go along with that. I think if you look at the structure of our living system, microorganisms or ourselves under the microscope, as it were (not literally), if you investigate a living system that is before us, that is accessible to us, one is driven to the conclusion, inescapably; that living systems could not have been generated by random processes, within a finite time-scale, in a finite universe. I think the evidence from life is very hard, a hard fact, from the nature of a living system as you study it in the lab. The information content in the living system that we have on the earth is perhaps the hardest cosmological fact. You can't get away from that, in the sense that the universe has to, in some way, discover this arrangement. I would put that datum above the cosmological datum in quality of information.

Has your work led you to a position that strongly favors the theistic view?

I would say so. Yes.

What do you think of the position taken by someone like Jacques Monod, who says that life is an accident, a chance occurrence?

I think it's not borne out by the facts at all. There's not a shred of evidence for it.

And it's more a metaphysical principle or judgment? It's not scientific in nature?

It is worse than that. It's a defiance of science. The scientific method should lead to quite the opposite result: That some miraculous property of life that's either explained in terms of a statistical miracle or in terms of an Intelligence intervening. It's one or the other.

Sir John Eccles said that Monod is increasingly sounding like a prophet.

But all these people do that. They have the general property of doing that. The people who work on the theories of the origin of life meet about two or three times a year and go around the world preaching their doctrine. They feel the need for doing this because their position is so insecure in terms of factual

knowledge.

What do you think of all these reports of life being created in the lab?

I think it's totally to be discounted. Whenever they say that there's any evidence for evolution in the lab, what seems to be involved is that they start with a living system, make very small changes to it, and recover a living system, that has either those changes or some other changes. They start with the desired result essentially. It's cheating.

What do you think of the work of people like Carl Sagan, who propagate the positivist point of view?

I think, from the couple of his lectures that I heard and the few things I've read of his, he has nothing original to say at all. He's just peddling the old mechanistic world view in relation to astronomy: the primordial soup that he starts all his expositions with, the non-existent, mythical, primordial soup. I think these people have no respect for facts at all. The facts are too disturbing. They consider it irrelevant.

Would you say the primordial soup account is fairly dominant or taken for granted by most of these evolutionists?

Yes, that is the starting point of their thinking —to say that it had to happen on the earth. And as I pointed out earlier, there's no logic that drives you to that conclusion at all. It's like saying, when you come to Wales here and discover that in certain parts of Wales they speak the Celtic language, that the Celtic language must have evolved from here. This is essentially what they're saying in terms of the life system. We know for sure that the Celtic language is imported from mainland Europe some couple of thousand years ago. In a very similar way the organizational pattern of life could have been imported from the outside, could have been extraneous input to the earth.

How would you evaluate the arguments of the Creationists?

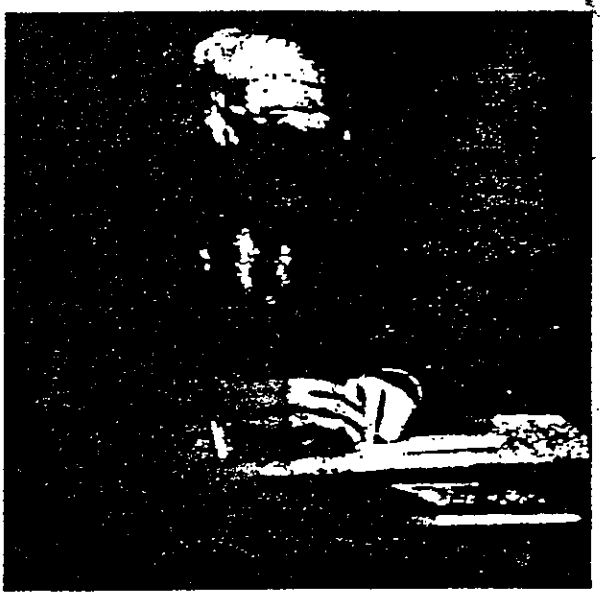
You mean the arguments that are justifications of their position? I think they have a very good case, by and large.

A minority among them insist on the "young earth" theory which is by no means essential to traditional Christian theism.

I would say that could kill them. It really would.

But in general how do you find their methodology?

It is highly commendable. I can't say it's in any way faulty. The greatest scientists of the nineteen century were Creationists. Even the man who really drove home the Darwinian theory of evolution, not Darwin, but Alfred Russel Wallace, never departed from the Creationist point of view. He believed that the small effects in biology, from the differences of one terrain to the other in the same kind of animal, could be explained in terms of natural selection. But he never went to the extreme and said that everything happened through natural selection and human beings evolved. He left out man. There are some marvelous quotes by Wallace. He couldn't believe that human attributes could have developed to the level of great mathematicians and musicians in response to natural selection.■



Naturalist Alfred Russel Wallace (1823-1913) is best known as the co-originator of the theory of evolution by natural selection. Contrary to Charles Darwin, however, Wallace observed that man's "intellectual capacities and his moral nature were not wholly developed by the same process." Wallace consciously attempted to reconcile science with theology.

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CREATION

I. The Vocabulary of Creation

"The root *bara'* has the basic meaning "to create." It differs from *yasar* "to fashion" in that the latter primarily emphasizes the shaping of an object while *bara'* emphasizes the initiation of the object. . . .

The word is used in the Qal only of God's activity and is thus a purely theological term. This distinctive use of the word is especially appropriate to the concept of creation by divine fiat.

The root *bara'* denotes the concept of "initiating something new" in a number of passages. In Isa 41:20 it is used of the changes that will take place in the Restoration when God effects that which is new and different. It is used of the creation of new things (*hadashot*) in Isa 48:6-7 and the creation of the new heavens and the new earth (Isa 65:17). Marvels never seen before are described by this word (Ex 34:10), and Jeremiah uses the term of a fundamental change that will take place in the natural order (Jer 31:22). The Psalmist prayed that god would create in him a clean heart (Psm 51:10[H 12]) and coupled this with the petition that God would put a new spirit within him (See also Num 16:30; Isa 4:5; 65:18).

The word also possesses the meaning of "bringing into existence" in several passages (Isa 43:1; Ezk 21:30 [H35]; 28:13, 15).

It is not surprising that this word with its distinctive emphases is used most frequently to describe the creation of the universe and the natural phenomena (Gen 1:1, 21, 27; 2:3, etc.). The usages of the term in this sense present a clearly defined theology. The magnitude of God's power is exemplified in creation. This has implications for the weak (Isa 40:26, cf. vv. 27-31) and for the unfolding of God's purposes in history (Isa 42:5; 45:12). Creation displays the majesty (Amos 4:13), orderliness (Isa 45:18), and sovereignty (Ps 89:12 [H 13]) of God. . . .

The limitation of this word to divine activity indicates that the area of meaning delineated by the root falls outside the sphere of human ability. Since the word never occurs with the object of the material, and since the primary emphasis of the word is on the newness of the created object, the word lends itself well to the concept of creation *ex nihilo*, although the concept is not necessarily inherent within the meaning of the word." *Theological Wordbook of the Old Testament,* s.v. *bara'*, by T. E. McComiskey.

The verb *'asa* has the basic connotation of "do" or "make." . . . .

When used of God, the word frequently emphasizes God's acts in the sphere of history. These contexts stress one of the most basic concepts of OT theology, i.e. that God is not only transcendent, but he is also immanent in history, effecting his sovereign purpose. . . .

The word occurs with great frequency in the Genesis account of creation, which is the first great act of God in history. The significant interchange between the words *bara'* "create" and *'asa* is of great interest. The word *bara'* carries the thought of the initiation of the object involved. It always connotes what only God can do and frequently emphasizes the absolute newness of the object created. The word *'asa* is much broader in scope, connoting primarily the fashioning of the object with little concern for special nuances.

The use of *bara'* in the opening statement of the account of creation seems to carry the implication that the physical phenomena came into existence at that time and had no previous existence in the form in which they were created by divine fiat. The use of *'asa* may simply connote the act of fashioning the objects involved in the whole creative process. *Theological Wordbook of the Old Testament,* s.v. 'asa, by T. McComiskey.

II. God, the Creator of All Things

A. God is the Creator of All Things.

Gen. 1.1 -- God created the heavens and the earth
Gen. 14.19 -- God Most High is Maker of heavens and earth.
Psalm 33.6,9 -- By the word of the Lord the heavens were made,
and all their host by the breath of his mouth,
He spoke and it came to be; He commanded and it stood firm.
See also Ps. 8.3; 19.1; 90.2; 102.25.

Isaiah 40.26, 28 -- Lift up your eyes on high and see:
Who created these? He who brings out their host and numbers them, calling them all by name; because he is great in strength, mighty in power, not one is missing. . . . Have you not known? Have you not heard? The Lord is the everlasting God, the Creator of the ends of the earth.
See also Isaiah 42.5; 45.18; Jeremiah 10.12-16

Romans 1.20,25 -- He is "the Creator, who is blessed forever,"
whose eternal power and deity are apprehended through the things he has made.
Acts 17.24 -- He is the God who made the world and everything in it.

Rev. 10.6 -- He is the One who lives forever and ever, who created heaven and what is in it, the earth and what is in it, and the sea and what is in it.

Revelation 4.11 -- "You are worthy, our Lord and God,
to receive glory and honor and power,
for you created all things,
and by your will they existed and were created."

B. All things were created <u>in</u> and <u>through</u> the Son, the Logos. John 1.3; Col. 1.16; Heb. 1.2.

C. All things were created <u>for him</u>, the Son of God. Col. 1.16. In Hebrews, the writer applies Ps. 102.25 to the Son, the earth and heavens are the work of his hands and like a garment to him. Then in speaking about the subjection of the world to come, he applies Ps. 8 to Christ as well. The point, which coordinates with the theme of the subjection of the world to Christ in a number of New Testament passages, is that all things have been given to him as an inheritance. The creation exists as the Father's gift to the Son. All things were created FOR HIM.

III. The Wisdom of God's Creation.

A. God created the heavens and the earth in such a way (and human beings in such a way) that human beings are able to relate to the created order in wisdom and understanding. See Proverbs 3.19-20; and 8.22-31. Wisdom in the Bible is skillful living, which includes both knowledge and skill (which is both technical skill in industry, farming and business as well as skill in human relations).

B. Wisdom is given by God as well as learned and developed by human beings.

IV. The Value of God's Creation

A. God proclaimed His creation, and all the things which compose it, *GOOD*! Genesis 1.31 -- God saw everything that he had made, and indeed, it was very good. This means that everything God has made has value to Him. Since our place in that creation is the place of stewards (God is the owner), we are to value the creation with the same value its owner has placed on it.

B. The creation manifests its value by praising, rejoicing in and bringing glory to God and to His Son.

Psalm 96.1,11-12 -- Sing to the Lord, all the earth . . . .
Let the heavens be glad, and let the earth rejoice;
let the sea roar, and all that fills it;

let the field exult, and everything in it.
Then shall all the trees of the forest sing for joy before the Lord.

Psalm 19.1 -- The heavens are telling the glory of God.
See also Psalm 104; 148.

Revelation 5:11-13 -- Then I looked, and I heard the voice of many angels surrounding the throne and the living creatures and the elders; they numbered myriads fo myriads and thousands of thousands, singing with full voice, "Worthy is the Lamb that was slain to receive power and wealth and wisdom and might and honor and glory and blessing!" Then I heard every creature in heaven and on earth and under the earth and in the sea, and all that is in them, singing, "To the one seated on the throne and to the Lamb be blessing and honor and glory and might forever and ever!"

C. God *cares* for his creation, is displeased when it is despoiled or mismanaged, and will himself redeem and restore it according to his original intention.

1. He places his claim of possession on all creation. Job 41.11; Ex. 19.15; Deut. 10.12-13; Ps. 50.12; Lev. 25.23.

2. He condemns human defilement, pollution and despoilation of his creation. Isa. 24.4-6; Jer. 2.7-8; Hos. 4.3; Rev. 11.18 -- "Your wrath has come . . . for destroying those who destroy the earth."

3. He discloses his plan to renew the creation. Hos. 2.18-22; Isa. 65.17; Rom. 8.19-21; 2 Pet. 3.13; Rev. 21.1.

4. This creation theology stands in contrast to Gnosticism and Gnostic as well as neo-platonic theologies which devalue the physical creation by eliminating all but human spirits from final eschatological reality.

V. Human Responsibility in a Biblical Theology of Creation

A. To Honor and Worship God. Romans 1. 18-25.

B. To Exercise Responsible Stewardship of God's Creation. Gen. 1.28-30; 2.15.

CREATION AND EVOLUTION

I. Scientific Naturalism

"According to naturalism, what is ultimately real is nature, which consists of the fundamental particles that make up what we call matter and energy, together with the natural laws that govern how those particles behave. Nature itself is ultimately all there is, at least as far as we are concerned. To put it another way, nature is a permanently closed system of material causes and effects that can never be influenced by anything outside of itself -- by God, for example. To speak of something as 'supernatural' is therefore to imply that it is imaginary, and belief in powerful imaginary entities is known as superstition.

Naturalism gives priority to natural science as a way of describing reality, because everything we know about nature, other than by direct observation, is the product of scientific investigation. Science may not be able to answer all questions, at least for the time being, but some of the most visionary scientists already speak of a 'theory of everything,' or 'final theory,' which will in principle explain all of nature and hence all of reality. Because (in this view) science is by far our most reliable source of knowledge, whatever conflicts with scientific knowledge is effectively false, and whatever is in principle closed to scientific investigation is effectively unreal. We might say that any supernatural reality or nonscientific knowledge is 'immaterial,' meaning both that it is not based on matter and that it is of no concern to us." Phillip E. Johnson, *Reason in the Balance, 37-38.*

"The most influential intellectuals in America and around the world are mostly *naturalists*, who assume that God exists only as an idea in the minds of religious believers. In our greatest universities, naturalism -- the doctrine that nature is 'all there is' -- is the virtually unquestioned assumption that underlies not only natural science but intellectual work of all kinds. If naturalism is true, then humankind created God -- not the other way around. In that case, rationality requires that we recognize the Creator as the imaginary being he always has been, and that we rely only on things that are real, such as ourselves and the material world of nature. Reliance on the guidance of an imaginary supernatural being is called superstition." Johnson, 7-8.

II. Naturalism and Evolution

"As the famous Harvard paleontologist George Gaylord Simpson straightforwardly put it, the 'meaning of evolution' . . . is that 'man is the result of a purposeless and

natural process that did not have him in mind.' Douglas Futuyma, author of a widely used evolutionary biology textbook for college students, is just as plainspoken: 'Some shrink from the conclusion that the human species was not designed, has no purpose, and is the product of mere mechanical mechanisms -- but this seems to be the message of evolution.'" Johnson, 8-9; See Simpson, *The Meaning of Evolution,* 344-45; Futuyma, *Science on Trial: The Case for Evolution,* 12-13.

"The most important claim of the theory -- the one that generates those sweeping statements about humans being the product of purposeless material forces -- is that a combination of random genetic changes and natural selection can generate extremely complex organisms from simple beginnings." Johnson, 11.

III. Theological Conflicts with Naturalistic Evolution identified by Christian Apologists

A. The existence of God and His activity of creating, sustaining, judging and redeeming the world.

B. The unique creaturehood of humankind as the image of God.

C. The authority of the Bible as divine revelation.

IV. Scientific Conflicts with Naturalistic Evolution identified by Christian Apologists

A. Absence of mechanisms for prebiotic evolution

B. Lack of evidence in the fossil record or presently observed life for intermediate forms.

C. Lack of evidence that random genetic mutation leads to increased systemic complexity.

V. Evangelical Alternatives to Naturalistic Evolution 91

A. Theistic Evolution -- Accepts the process of evolution advocated by scientific naturalism except to say that God guides and controls the process.

B. Mature or Fiat Creationism

1. Advocates -- The Institute for Creation Research; Henry Morris, Duane Gish, John Whitcomb.

2. Distinctive Views

a. All of creation was accomplished in six 24 hr. days (144 hrs). Consequently, the cosmos is only 10,000 years old at most.

(1) This is the only interpretation of Genesis 1 that is consistent with inerrancy.

(2) This is the only alternative to naturalistic evolution.

b. All geologic sedimentation and fossil distribution including the fossilization process is due to the universal flood recorded in Genesis 6-9.

c. Some microevolution processes have occurred but no macroevolution.

3. Problems with this view

a. The age of the cosmos

b. The interpretation of the days of Genesis 1

c. Failure to demonstrate the Flood as the single mechanism responsible for all geologic sedimentation and fossilization.

d. Failure to consider legitimate hermeneutical options for Genesis 1.

4. Benefits of the Work of the Creation Research Institute

C. The Gap Theory -- The view that Genesis 1.1 records an original creation but that Genesis 1.2 refers to a recreative or restorative process long ages after the original creation. Hence, a long gap of time separates the original creation of Genesis 1.1 and the recreation process which begins in Genesis 1.2.

1. Problems in this view

2. Benefits

D. Progressive Creationism

1. Advocates -- Walter Bradley and other speakers of the Veritas Forum; Hugh Ross; Phillip Johnson; Pattle Pun.

2. Distinctive Views

a. Affirmation of biblical inerrancy and the necessity to explore hermeneutical options in the interpretation of Genesis 1.

b. Affirmation of the need to take empirical observations into account in biblical interpretation.

c. Interpretation of the days of Genesis 1 as long periods of time not 24 hr. days.

d. Interpretation of the alternation of the verbs "create" and "make" in Genesis 1 to indicate a combination of miraculous and providential process during the "days" of creation.

e. Affirmation of an "old" cosmos corresponding to the age yielded by various scientific dating techniques.

f. Affirmation of a unique creation for human beings.

g. Affirmation of both catastrophic and uniformitarian processes in geologic sedimentation and fossilization.

h. Affirmation of microevolutionary processes but not macroevolution. The primary diversity between phylum is due to direct divine miraculous action.

3. Some Advantages of this position

a. Proper biblical interpretation

b. General correlation with cosmological theory

c. General correlation with the geologic and fossil record

d. Consistency with evangelical theology

Various Evolutionary Models

Foundational World Views

Naturalism

1. Nature needs no explanation beyond itself. This is the rejection of a supernatural Being.
2. All the objects in nature have material causes and conditions. This is the primacy of the physical.
3. Objects with similar properties are caused by similar causes on the basis of similar laws. This explains the homogeneity of the animal world.
4. Human consciousness and ideals are products of nature and not constitutive of it. The background dominates reality or reality emerges from context.

God's Relationship to His Creation

A. **Agnostic Naturalism.** Life originated on Earth by natural processes. We must suspend both belief and disbelief in how God might have influenced those natural processes because of insufficient evidence upon which to base a decision.

B. **Atheistic Naturalism.** Life originated on Earth by natural processes apart from any supernatural intervention or contribution. There is no God.

C. **Deistic Naturalism.** Life originated on Earth by highly ordered natural processes. After creating the universe, God retired, leaving the creation to go on its own. God does not interfere, thus science need not fear any disruption of its efforts to determine the uniform laws of nature.

D. ***Deus Absconditus.*** Literally, "the God who hides." God intentionally veils Himself so as to give human creatures ample room and opportunity to express their freedom and faith. God exists but cannot be found (by scientific inquiry).

E. **Intelligent Design.** The universe reveals a consistent intelligent pattern. These universal principles and laws are comprehensible to science. There must be an intelligent designer.

F. **Intervention.** The view that God intervenes in the development of Humans. God is profoundly present in and for His creation even to the point of breaking his own rules to accomplish His purposes.

G. **Purposive Design.** The creation is following a pattern designed by God. Life follows the pattern in order to fulfill the plan of God.

H. **Special Creation.** The theological concept that God created the universe all at once and in a relatively short time. This creative act is "special" in the sense of being direct and miraculous as opposed to using laws and processes of nature, including evolution, to accomplish the task indirectly.

I. **Strong Theistic Evolution.** Life originated on Earth through evolutionary processes designed and manipulated by God.

J. **Theistic Naturalism.** Life originated on Earth by natural processes influenced not only by God, but through principles established at some point in distant past by God. God does exist and occasionally intervenes in His creation.

K. **Weak Theistic Evolution.** Life originated on Earth through evolutionary processes designed but not manipulated by God.

Evolutionary Models

Evolution: The claim that the origins and development (especially of organisms) followed a continuous natural, that is, law-bound, process, from their beginning forms to those extant today.

1. **Autoevolution**. Self-organizing power of the evolutionary process traced back to the inherent structure of the atoms and molecules themselves.

2. **Continuing Evolution.** This version of evolution takes place within species (reproductively isolated groups of interbreeding natural populations) as well as between species.

3. **Cultural Evolution.** The rapid change (more rapid than biological evolution) among *H. sapiens* brought about through the development of civilization and especially technology. Famines, epidemics, and predators, have been greatly diminished in modern times. Improved nutrition, eye glasses, etc, have replaced that which natural selection would select against. Cultural evolution is concerned with reproductive strategies and **Sociobiology**.

4. **Coevolution.** The evolution of two or more species due to mutual influence; for example, many species of flowing plants and their insect pollinators have coevolved in a way that makes the relationship more effective.

5. **Commensalism.** A form of symbiosis (intimate coexistence) in which one species profits from the association without harming or benefitting the other.

6. **Convergent Evolution.** The increasing similarity during evolution of two or more unrelated species. Example: the placental wolf of the northern hemisphere and its remarkable look-alike, the marsupial "wolf" of Australia.

7. **Darwinian Gradualism.** Variation in all species is limited to chance variation granting an advantage (survival and reproduction) in the struggle for life. If this variation were inherited, the characteristics of the species changes over great periods of time.

> **Alternatives**
> a. **Margulis' Alternative to Gradualism**. Rather than competition and strife, species advance by cooperation and symbiosis. See for example the Mitochondria. Problem: Symbiosis starts with complex, already-functioning systems.
>
> b. **Complexity Theory.** Systems with a large number of interacting components spontaneously organize themselves into ordered patterns.

8. **Darwinism.** Evolution by natural selection (the theory that some heritable variations among members of a species confer a slight advantage in the competitive struggle for survival, resulting in a gradual modification of the characteristics of the species and the formation of new species), originally proposed by Charles Darwin.

9. **Deistic Evolution.** God began the processes of evolution but His involvement at the beginning as now is unknowable due to a lack of evidence.

10. **Evolutionary Biology.** An umbrella term for a broad array of disciplines that have in common their focus on the evolutionary process and hence the creation of biodiversity. Evolutionary biology includes the study of molecular evolution, ecology, population biology, systematics, biogeography, and comparative aspects of anatomy, physiology, and animal behavior. Also called **Neo-Darwinism**.

11. **Lamarckism.** The theory that evolutionary changes in a species are primarily the product of changes in individual organisms acquired during their lifetime by habitual use and inherited by their descendants. A belief in the inheritance of acquired characteristics.

12. **Macroevolution.** Large-scale evolution, entailing major alterations in anatomy or other biological traits, sometimes accompanied by adaptive radiation.

13. **Microevolution** (Genetic Mutation). Evolutionary change of minor degree, such as an increase in size or body part, usually controlled by a relatively small number of genes.

14. **Neo-Darwinism.** The modern study of the evolutionary process that assigns a central role to natural selection, the idea originally suggested by Darwin and now informed by substantial new knowledge from genetics, ecology, and other modern disciplines of biology. See **Evolutionary Biology.**

15. **Neo-Lamarckian Evolution.** The behavior of a species will effect their genetics thus altering their evolutionary path. See **Sociobiology.**

16. **Orthogenic Evolution** The organism has an internal directedness to the evolutionary process--a straight line evolutionary course. Incompatible with environmental adaptation, natural selection chooses the best-adapted variants for continued survival.

17. **Punctuated Equilibrium.** A theory proposed by Niles Eldredge and Stephen Jay Gould in which they postulate that for long periods of time species undergo little observable change. When change does occur, it is rapid and concentrated in small, isolated populations.

18. **Phylectic Evolution.** Gradual change within an evolving line.

19. **Sociobiology.** The study of the evolutionary and genetic origins of social behavior in non-human and human species.

20. **Source-Sink Model.** The hypothesis that species diversity, especially in tropical forests, builds up when restricted localities favorable to certain species allow them to produce a surplus of emigrants, hence to be a source of new individuals dispersing to less favorable sites nearby, the sinks.

21. **Spontaneous Generation.** The one-step appearance of life from nonlife.

22. **Synthetic Theory of Evolution.** The modern evolutionary synthesis of many branches of biology including genetics, systematics, paleontology, comparative anatomy, embryology, etc. Also known as Neo-Darwinian Evolution.

Life on Mars?

Are We Alone in the Universe?

Dr. Ray Bohlin

Life on Mars?

In August 1996, a group of scientists from NASA proclaimed they had found evidence of life on Mars (*Science*, 16 August 1996, 273:924-30).The group from NASA had studied a meteorite that had been found in the ice of Antarctica. Previously, it had been determined that this meteorite had originated on Mars by studying the gaseous content of glass-like components of the meteor. The gas composition matched very well the atmosphere of Mars. This conclusion seems reasonable.

The group from NASA looked for evidence of life on and in the crevices of the meteor and found two types of molecules that can result from life processes: carbonates and complex molecules called polyaromatic hydrocarbons or PAHs. They also found shapes in the rock that resembled those of known microfossils on earth. Microfossils are fossils of one-celled organisms which are rather tricky to interpret.

The NASA scientists felt that these observations provided evidence to suggest that life once existed on Mars. However, the chemical signs could all be due to processes that have nothing to do with life, and the "supposed" microfossils are 100 times smaller than any such fossil found on earth. Other groups that studied this same meteorite concluded that either the temperature of formation of the chemicals was far too high to allow life (over 700 degrees C) or that other chemical signals for life were absent. John Kerridge, a planetary scientist from the University of California at San Diego, said, **"The conclusion is at best premature and more probably wrong."**

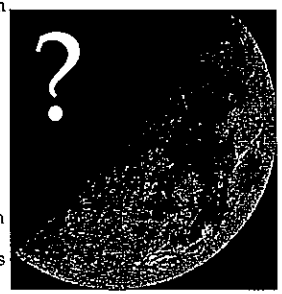
Over one year later, the controversy remains. Additional articles have appeared both supporting and criticizing the early NASA claims. *The Dallas Morning News* recently reported that only about 20% of the planetary scientists at a recent meeting discussing the meteorite concluded that it contained signs of life (*DMN*, 30 June 1997, p. 2-F). Although neither the Pathfinder spacecraft (landed on Mars July 4, 1997) nor the Global Surveyor spacecraft (entering Mars orbit in September 1997) were designed to search for signs of life, they are both expected to add further data to the continuing discussion of the possibility of life on Mars.

What would life on Mars mean?

But what if they are right? What if life really *did* exist on Mars?

For evolutionists the evidence is perceived as confirmation that life actually arises from non-life by purely chemical processes. Therefore, even though origin of life research is actually at a standstill, such a discovery seemingly confirms the notion that *some* chemical evolution scenario *must* work.

On the other hand, some have stated that if there is life on Mars, Creationism has been dealt a death blow. They rationalize that since (1) we now know that life can evolve just about anywhere, and (2) the Bible never speaks of life anywhere but on Earth, the Bible is, therefore, unreliable. Besides, they reason, why would God create life on a planet with no humans? However, since the Bible is silent on the subject of extra-terrestrial life, we can make no predictions about its



Life on Mars? cont'd on pg 5

It's possible that we may never know. This meteorite just may not contain enough information to satisfy everyone. There's only so much you can do with four pounds of rock. Dr. John Valley, University of Wisconsin, quoted in the *Dallas Morning News*, 30 June 1997, p. 2-F.

Life on Mars? cont'd from page 4

possibility. God is certainly free to create life on planets other than Earth.

From the evolutionary perspective, if life is found to have existed on Mars, did it necessarily evolve there? The simple answer, inexplicably avoided by the media, is NO! The most reasonable explanation to the possible discovery of life on Mars is that the "Martian life" actually came from Earth!

First, how did this Martian meteorite get to Earth? It is hypothesized that a large meteorite crashed into Mars throwing up lots of debris into space, some of which found its way to Earth. Then some of that debris was found by earthlings. If you are thinking with me, you now realize that the reverse scenario could have been played out on Earth, sending a rock *from* earth, pregnant with life, *to* Mars.

The Improbability of Life Elsewhere in the Universe

Over the last two decades scientists have begun tabulating many characteristics of our universe, galaxy, solar system, and planet that appear to have been finely-tuned for life to exist. Christian astronomer and apologist, Dr. Hugh Ross documents all these characteristics in his book *Creator and the Cosmos* (NavPress, 1995, pp. 111-45). Ross documents 26 characteristics of the universe and 33 characteristics of our galaxy, solar system, and planet that are precisely adjusted to allow for life to exist including the size, temperature, and brightness of our sun, and the size, chemical composition, and stable orbit of earth.

The probabilities of all these factors coming together by natural processes alone are 1 in 10^{53}. A very liberal estimate of how many planets there may be (though we have only documented 20: 9 in our solar system and 11 outside our solar system), is 10^{22} or 10 billion trillion planets, one for every star in the universe. Combining these two probabilities tells us that there are 10^{31} planets in the entire universe that could support life. Obviously this is far less than one; therefore, by natural processes alone, *we* shouldn't even be here let alone some kind of alien life form.

Independence Day, the Movie

In the movie *Independence Day*, an alien battle force swoops down on earth with the intention of destroying the human race, sucking the planet dry of all available resources, and then moving on to some other unlucky civilization in the galaxy. But, those indomitable humans aided by good old American ingenuity outsmart the dull-witted aliens and earth is saved. The story has been told many times, but perhaps never as well or never with such great special effects.

But why are we continually fascinated by the possibility of alien cultures? The movie gave the clear impression that there *must* be great numbers of intelligent civilizations out there in the universe.

Few recognize that the supposed existence of alien civilizations is based on evolutionary assumptions. The science-fiction of "Star Trek" and *Star Wars* begins with evolution. Evolutionists simply rationalize that since life evolved here with no outside interference, the universe must be pregnant with life. Inherent within these assumptions and rationalizations is fear. If we are truly alone in the universe with no God or other civilizations to commune with, that is a truly terrifying proposition. The purposelessness of the universe becomes suffocating. Therefore, the atheistic scientist clings desperately to the notion of other civilizations.

The odds overwhelmingly dictate that our planet is the only one suitable for life in the universe. The chemistry on earth also indicates that life is extremely hard to come by. The probability of life based simply on chance occurrences is admitted by many evolutionists to be remote indeed. Some suggest that life is inevitable because there are yet undiscovered laws of nature that automatically lead to complex life forms. However, we know of no natural processes that will lead automatically to the complexities of life. Everything we know of life leads to the opposite conclusion. Life is not a product of chance or necessity. Life is a product of intelligence.

Without Divine interference we are alone in the universe and without Christ we are–and should be–terrified. The gospel is as relevant as ever. ■

"Some similar chemistry must have occurred on a billion other worlds in the Milky Way Galaxy. The molecular tiles of life fill the Cosmos."

–Carl Sagan, *Cosmos*, Random House, 1980, p. 40.

94C

A SUMMARY OF CREATION VS. EVOLUTION

by

Dr. Daniel L. Akin

Creation is one of the most important doctrines to the Christian faith. It is perhaps second in importance only to Christology. The creation of mankind as male/female (Gen. 2:24; Matt. 19:5; 1 Cor. 6:16; Eph. 5:31) in the image of God with the assignment to rule and exercise dominion over the world (Gen. 1:26-28; Ps. 8:4-6; Heb. 2:6-8; Rev. 21:1-2) is essential to a biblical worldview. The biblical worldview has three emphasis: 1) God who is the personal, divine, omnipotent Creator; 2) The world which is an ordered, and supernatural creation; and 3) man who is a unique, but dependent creature. It is, therefore, the explanation of the world and creation with God as sovereign ruler. In contrast, process thinking and various forms of finite God would deny God as sovereign ruler.

Creation is a broad subject, and one which must honor the breadth of the doctrine in science as well as in the Bible. Evolution likewise must be understood in a broader and more holistic sense. Any theory of evolution must include the rise of the modern theory and its full development in modern western culture and thought. Simplified, it can be defined as an explanation of the world and of creation without God. Such ideas as "scientific rationalism," "process thinking," and "secular humanism," must be incorporated into any system of thought which draws upon the evolutionary hypothesis.

The importance of the evolutionary worldview to modern scientific mentality and institutions cannot be overemphasized. Beginning around 1800 with the works of men like David Hume, Immanuel Kant, Fredrick Schleiermacher, and George Hegel, supernaturalism was dismissed and a world view which deified (or at least "exalted") man was greatly accelerated. Genesis 3 was tragically coming to fruition.

Darwin was not the founder of modern evolution, but was a part of a larger anti-supernatural world view movement. His influence was substantial, however, and incredible technological advancements (industrial to informational) only energized his claims for an autonomous humanity. Modern evolution is remarkably adaptive as Philip Johnson has clearly demonstrated in his works Darwin on Trial and Reason in the Balance. In the marketplace of ideas one may now purchase from the shops of Darwinianism, Neo-Darwinianism, Punctuated Equilibrium, or a host of other options. Such a growth in diversity, in a real sense, signals what Michael Denton has described as "a theory in crisis."

In all of this development one thing has remained constant--the antisupernatural core of evolutionary/humanistic thought. As Lanier Burns of Dallas Seminary has accurately said, "The evolutionary world view has accordingly developed in opposition to the biblical world view at every point: God equals man, the world equals a natural happening, and man equals an evolved autonomous animal." The bottom line then still remains: 1) supernaturalism verses naturalism, 2) eternal God verses eternal matter, and 3) purposeful design verses random chance.

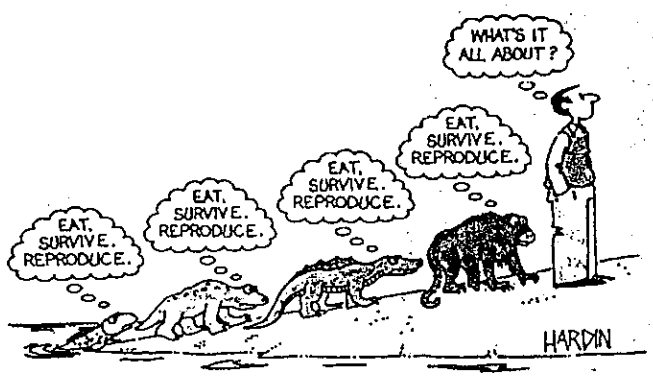
Amidst the complexity and divergency of modern argumentation, one must remember that the evolutionary world view is an open ended (Hegel), relativistic (no absolutes) explanation of the world without God (Gould). Its prior commitments and ideological affirmations cannot and should not go unnoticed or without critique. Its amoral ethics and open-endedness translates tragically into immorality in a fallen world which leads individuals and cultures toward self-destruction. The absolutes of the Bible have been rejected for relative facts and proofs sufficient for the moment. Its naturalistic method has developed its own paradigms (or models), which emphatically and dogmatically exclude a supernatural/biblical world view.

Some attempt to bridge the biblical and evolutionary world views. There has been, however, little success. With respect to ancient history for example (with paleontology and geology), there is simply much that we do not know. Common sense and good investigative methods dictate we should retain reason and constructive criticism as a check against irrational claims, but in the context of a biblical theology. Reason is a friend of Christianity so far as we can and must think carefully and responsibly, but Rationalism (reason as the highest authority) has not been an ally of biblical thinking or a Christian world view.

CONCLUSION

1. Evolution is not only a theory of origins but also a world view which seeks to explain life apart from God. It has a long and sophisticated tradition with many articulate spokesmen who have controlled and affected the institutions of the modern world. Its relativism has allowed it to move about so that we cannot rest in static answers about what the theory proposes, but must be well read to answer accurately the different nuances that the theory presents.

2. Creationists must deal with evolution with careful and well reasoned thinking. We must realize with wisdom how much it has penetrated our lives, society and culture. The apologetical task has never been more challenging. We must offer creation as the biblical world view noting its importance secondly only to Jesus Christ and His resurrection. Gains and losses of creationists in many instances reflect both the good teaching of many, and the failure to deal adequately with the politics of evolution by others. Ultimately, we fight not for victory, but from victory. But we must also understand that in this day and time the very souls of our culture are at stake over this issue and many others which relate to it.



PHILIP YANCEY

Jesus and the Big Bang

The Apollo missions, the greatest technological achievement of our species, gave the first real glimpse of our puny place in the universe.

Stephen Hawking breathlessly reports in the new edition of *A Brief History of Time* that the publisher has sold one copy for every 750 men, women, and children on the planet. I finally joined that constellation of readers and came away awed at the vastness and complexity of our universe.

Science teeters between hubris and humility. Hawking's book shows how much we have learned. Yet just in the last few years astronomers have admitted underestimating the number of galaxies by 50 billion or so (oops!) and missing the age of the universe by around 8 billion years—and, oh yes, there is that embarrassing "dark matter," which no one has found yet but which may constitute 90 percent of the matter in the universe.

I remember the early Apollo missions, when engineers took pride in the spacecraft's 5 million parts, all of which had to work together with precision. This, the greatest technological achievement of our species, gave the first real glimpse of our puny place in the universe. As Stephen Hawking describes it, Earth is "a medium-sized planet orbiting around an average star in the outer suburbs of an ordinary spiral galaxy, which is itself only one of about a million million galaxies in the observable universe."

To the Apollo astronauts, though, that humdrum planet looked just fine. Jim Lovell, reflecting on the scene, said, "It was just another body, really, about four times bigger than the moon. But it held all the hope and all the life and all the things that the crew of Apollo 8 knew and loved. It was the most beautiful thing there was to see in all the heavens."

Scientists have a hard time imagining how it all happened. As astronomer Chet Raymo puts it, "If, one second after the Big Bang, the ratio of the density of the universe to its expansion rate had differed from its assumed value by only one part in 10^{15} (that's 1 followed by 15 zeros), the universe would have either quickly collapsed upon itself or ballooned so rapidly that stars and galaxies could not have condensed from the primal matter."

For those of us who have trouble counting in billions, Raymo explains, "If all the grains of sand on all the beaches of the Earth were possible universes—that is, universes consistent with the laws of physics as we know them—and only one of those grains of sand were a universe that allowed for the existence of intelligent life, then that one grain of sand is the universe we inhabit."

Looking at the world through a microscope rather than a telescope, Douglas Hofstadter ponders in amazement the complexity of the DNA genetic code:

> A natural and fundamental question to ask, on learning of these incredibly intricately interlocking pieces of software and hardware is: "How did they ever get started in the first place?" It is truly a baffling thing. . . . There are various theories on the origin of life. They all run aground on this most central of all central questions: "How did the Genetic Code, along with the mechanisms for its translation . . . , originate?"

Both these scientists share Hawking's religious agnosticism, and yet all three concede that the universe appears to be tuned with inconceivable precision so as to foster intelligent life on this planet. (Scientists call this observation "the anthropic principle.") Why? That question lies outside the realm of science.

For an answer to the "Why?" question, Christians look to Jesus of Nazareth—who, the New Testament tells us, was present at the moment of creation. In a remarkable scene with his disciples the night of his arrest, Jesus pulled back the curtain, allowing a peek at his life before Bethlehem.

"And now, Father, glorify me in your presence with the glory I had with you before the world began," Jesus prayed. He is reminiscing about life before planet Earth, eternity before time. In this lengthy, astonishing prayer (John 17:1–26), he gives the answer to the "Why?" question. From the beginning—*before* the beginning—God willed to share with other creatures the same love lavished on the Son "before the creation of the world."

Earth was indeed created with an anthropic principle. God's grace, claims Paul, "was given us in Christ Jesus before the beginning of time" (2 Tim. 1:9). Jesus' sacrifice on our behalf was "chosen before the creation of the world" (1 Peter 1:20). Similarly, our hope for eternal life was promised "before the beginning of time" (Titus 1:2).

Thus the essentials of theology—God's love, election, grace, atonement, resurrection—are specifically grounded outside time and creation. Long before Einstein's theory of the relativity of time and space, long before any notion of a Big Bang origin of the universe, the New Testament writers established these truths as, quite literally, timeless.

Stephen Hawking cites with approval Augustine's notion that any God must exist outside time. We are confined to a space-time universe that began at a moment of time, but God is not. Our sun, now middle-aged, will burn itself out in 5 billion years. Eventually the universe itself may collapse. Yet from the lips of the Creator we have a promise that we will join him, and see his glory, and share in it for eternity.

The universe is not such a lonely place after all, for God's love is longer than time. CT

A Christian View of the Environment

Ray Bohlin (Probe Ministries)

I. **Is there an environmental crisis?**

A. Land is being converted and habitats destroyed at an increasing rate.

B. Some estimate that three species are becoming extinct every day.

C. Land is being degraded by overuse of fertilizers, herbicides, and pesticides.

D. Hazardous chemicals and wastes are finding their way into the environment.

E. Pollution is rapidly ceasing to be a local problem and is becoming a global problem.

F. The atmosphere's ability to regulate itself is being perturbed by excess carbon dioxide, CFC's, and other gases.

G. Human cultures that know how to live in harmony with nature are rapidly disappearing.

II. **Some have blamed Judeo-Christian thought for our ecological problems.**

A. That man is to have rule and dominion over the earth justifies the notion that what can be done should be done.

B. Many have suggested that the problem is not technological, but philosophical. The Judeo-Christian heritage of the West must be abandoned.

III. **The world views of naturalism and pantheism have been offered as substitutes.**

A. ***Within the naturalistic world view, the ultimate value is human survival.***

1. *Man cannot survive without a healthy planet.*

2. *We must act to preserve our planet in order to rescue the future of our children.*

3. *This view is ultimately pragmatic.*

a. The value of nature is degraded to the whim of egoistic man.
b. This view will ultimately be destructive in the long run.

B. ***In the pantheistic world view, all of nature is equal because all is god and god is all.***

This thinking will be prevalent among New Age enthusiasts.

1. *Nature is respected and valued because it is a part of the essence of God.*
2. *We must act to save our planet because it has equal value with man.*
3. *But while pantheism elevates nature, it subsequently degrades man and will ultimately degrade nature.*
   a. Man has no more value than a blade of grass.
   b. In pantheism, it is the whole of nature that has meaning. The individual particulars of nature do not have intrinsic meaning or value.
   c. Therefore, the will to care about a particular species, for example, is derived only by romanticizing nature.
   d. In practice, pantheism has no answer for the two faces of nature; benevolent and destructive.

IV. **The true answer lies in a Christian environmental ethic that is based on the reality of God as Creator and man as his image-bearer and steward.**

A. ***God is the Creator of all things. The creation is not part of His essence.***

(Gen. 1, 2; Job 38–41; Psalm 19:1, 24:1–2, 104; Rom. 1:18–20; Col. 1:16–17)

1. *All of nature is equal in its origin, including man.*
2. *Nature has value in and of itself because God created it.*
3. *The rock, tree, and the cat deserve our respect because God made them to be as they are.*

B. ***While man is a creature, he is also created in God's image.***

(Gen. 1:26–27; Psalm 139:13–16)

1. *Man is therefore separated from creation yet related to it.*
2. *While a cat is not to be romanticized as though it has human emotions, as Christians, we respect it as having value since God made it. The cat's purpose is to glorify its creator.*
3. *Man was given dominion over nature.*
   a. Man is not sovereign over the lower orders of creation. He does not own them. They belong to the Lord.
   b. Since man was told to cultivate and keep the garden, we certainly may use nature, but only as God intends (Gen. 2:15). An example is the parable of the talents (Matt. 25:15–30). Technology puts nature to man's use, but unnecessary pollution and waste degrades it.
   c. We are to exercise dominion over nature not as though we are entitled to exploit it but as something borrowed or held in trust.

V. **The source of our ecological crisis lies in man's fallen nature and abuse of his dominion.**

A. ***Man is a rebel who has set himself at the center of the universe.***

1. *Man has used his dominion wrongly.*
2. *Man has exploited created things as though they were nothing in themselves and as though he has an autonomous right to use them as he pleases.*

B. ***Man's fallen nature has expressed itself with regard to the creation in his use of time and money.***

1. *Man's uncontrolled greed and haste have led to the deterioration of the environment.*
2. *We have been guided by the maxim that what we can do, we will do. Particularly if it is the least time-consuming and the least expensive alternative.*

VI. **The solution to the environmental crisis is the witness of the Christian community in the proper relationship between God, man, and nature.**

A. ***We are called to exhibit our dominion rightly.***

1. *As Christians we must treat nature as having value in itself and exercising dominion without being destructive (Matt. 6:26, 10:29).*
2. *This requires both a human and economic cost.*
3. *There are numerous Old Testament examples of the care for which Israel was treat the environment.*
   a. Israel was to care for the land (Lev. 25: 1–12).
   b. They were to treat domesticated animals properly and respect wildlife (Deut. 25:4 and 22:6).
   c. The Lord judges those who misuse the land (Isa. 5:8–10).
   d. The Lord nurtured and cared for His creation (Job 38:25–28; Psalm 104:27–30).

B. ***As the second Adam, Jesus redeems all of the effects of the curse***

(1 Cor. 15:21–22; Rom. 5:12–21).

1. *The first Adam brought a curse on man's relationship with his God, his relationship with other people, and his relationship with nature (Gen. 3:14–19).*
2. *Though the earth will eventually be destroyed, we should still work for healing now. As Christians, we can be rightly related to the creation.*

C. ***Christians of all people should not be destroyers.***

1. *We may cut down a tree to build a house or make a fire, but not to just cut it down.*
2. *We have the right to rid our house of ants, but we should not forget to honor the ant where God made it to be.*
3. *When the church puts belief into practice, our humanity and sense of beauty are restored.*

VI. **The church in the past has failed in its mission of steward of the earth.**

A. We have spoken out loudly against the materialism of science but have done little to show that we are not dominated by a technological orientation towards nature.

B. We are losing an evangelistic opportunity as many are seeking an improved environment yet they also see that most Christians don't care.

C. While there is not necessarily anything wrong with profit in the marketplace, we must voluntarily limit ourselves and not allow something to be done just because it can.

D. If individually and as a Christian community we can treat with integrity the things God has made, and do so lovingly because they are His, things change.

Bibliography

Schaeffer, Francis. *Pollution and the Death of Man: A Christian View of Ecology.* Wheaton, Ill.: Tyndale, 1970.

Much of the skeleton of the above outline is derived from this book. Though it dates back to 1970, it is still the best short treatment that deals with the environmental issue as a whole. While you won't find a lot of data concerning the ecological crisis, Schaeffer will walk you through how to think about this complex topic within the scope of a Christian world view.

Elsdon, Ron. *Bent World: A Christian Response to the Environmental Crisis.* Downers Grove, Ill.: InterVarsity Press, 1981.

Elsdon contributes a significant amount of information on the extent of the environmental crisis and the shortage of resources. He also outlines the basis of a Christian response and what options are available both in attitude and practical steps.

Beisner, E. Calvin. *Prospects for Growth: A Biblical View of Population, Resources, and the Future.* Westchester, Ill.: Crossway Books, 1990.

This book provides a carefully documented apologetic for the proposition that statistics can't always be believed. As bad as the environmental situation is, it is not as bad as some would have us believe. There is still a great deal about this earth that we don't know. Predictions concerning the future can be hopelessly flawed.

Badke, William. *Project Earth: Preserving the World God Created.* Portland, Ore.: Multnomah Press, 1991.

This book is a strongly written attempt to jar the church out of its environmental doldrums. Badke persuasively argues that the church needs to be at the forefront of the environmental movement because only Christianity has the right reasons to do so. The strict anti-growth perspective could have been tempered down some. Especially helpful is an appendix of environmental tips for households and churches.

DeWitt, Calvin B., ed. *The Environment and the Christian: What Can We Learn from the New Testament?* Grand Rapids, Mich.: Baker Book House, 1991.

A collection of essays defending an environmental ethic from a strictly New Testament perspective. What comes across clearly, however, is that the Old Testament still contains the foundation for any environmental ethic for a Christian. The New Testament adds to and confirms the Old Testament ethic in regards to nature. A criticism is that the book does not offer a strong enough rebuke of New Age thinking. Christianity is only offered as an "alternative."