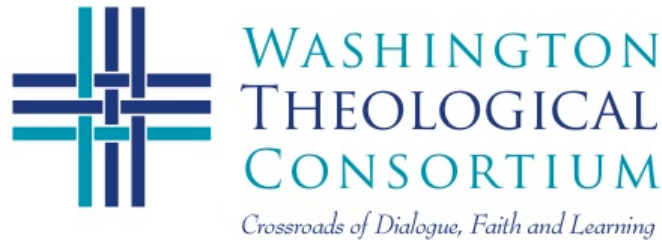


Evolution and Original Sin: Accounting for Evil in the World

by Dr. Daryl P. Domning and Dr. Joseph F. Wimmer



The Washington Theological Consortium (WTC) produced this discussion guide as part of a series titled "At the Crossroads of Science and Theology." The series aims to connect the interests and expertise of faculty in Washington-area theological schools with the questions and concerns of people in congregations regarding the relationship between science and religion. We hope to bring theological reflection and scientific research to adult education groups, in an interdisciplinary and ecumenical exploration of fundamental issues in this relationship. You may contact WTC at (202) 832-2675 for further information about this series, or visit the organization's Web site at <http://washtheocon.org>.

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About the Authors

Dr. Daryl P. Domning is a paleobiologist and professor of anatomy at Howard University in Washington, DC. He earned his PhD from the University of California, Berkeley, in 1975. Dr. Domning is considered the world's foremost expert on the evolution of sirenians, an order of marine mammals among whom the manatee is perhaps the best known. His recent discovery of a 50-million-year-old skeleton of an amphibious sirenian with legs is considered one of the best fossil examples of the transition from land-based to sea-dwelling animals. Dr. Domning is a parishioner at St. Camillus Catholic Church, Silver Spring, MD, where he is a member of the RCIA (Rite of Christian Initiation of Adults) team. With theologian Monika K. Hellwig, he has coauthored the book *Original Selfishness: Original Sin and Evil in the Light of Evolution* (Ashgate, 2006).

Rev. Joseph F. Wimmer, OSA, currently serves as associate professor of Sacred Scripture at Washington Theological Union. He earned his doctorate in Sacred Theology at the Pontifical Gregorian University in Rome in 1980. As Regent of Studies of Augustinian College in 1968, Fr. Wimmer became one of the signatories of the founding document of the Washington Theological Union. Among his publications: *Fasting in the New Testament* (Paulist Press, 1982), *The Psalter: A Faithful and Inclusive Rendering from the Hebrew into Contemporary English* (1994) (as a member of the translating staff and editorial board of the International Committee for English in the Liturgy), and *The Canticles* (1994).



Andromeda

Table of Contents

	Page		Page
About the Authors	2	The Intimate Relationship between Nature and Grace	51
Introduction	4	Concupiscence	52
		<i>Major Points</i>	53
Evolution According to Contemporary Science	5	<i>Discussion Questions</i>	54
<i>How a Darwinian Understands Nature: How Has Life Evolved?</i>	5	A New Interpretation of Original Sin	55
What Is a Theory?	6	Original sin and its evolutionary roots in animal behavior	55
Darwinian Understanding of Evolution	7	Original Sin as Evolutionary Selfishness	56
The Evolutionary Roles of Pain, Suffering, and Death	11	Advantages over Other Interpretations	57
The Significance of Consciousness	13	<i>Original Sin, Grace, and Salvation:</i>	59
Does Evolution Exclude God, Meaning, and Purpose?	14	Semantic Difficulties	59
<i>Major Points</i>	16	The World as a Work in Progress	61
<i>Discussion Questions</i>	17	A Good or a "Fallen" Creation?	62
		Are There Fates Worse than Death?	63
		Is There an Alternative?	65
Evil, Ethics, and Human Values in an Evolving World	18	A Humble or a Disciplinarian God?	67
Selfish Behavior of Primates and Other Animals	18	Summary and Conclusion	69
The Evolution of Ethics	21	<i>Major Points</i>	71
Judeo-Christian Ethics versus Darwinian Rules	23	<i>Discussion Questions</i>	72
Static (Cyclic) versus the Evolutionary Universe	26	Appendix: Answers to Objections to the Darwinian View of Nature	73
Biblical Origins of Science	27		
<i>Major Points</i>	29	Glossary	86
<i>Discussion Questions</i>	30	Bibliography	
		Resources	
Original Sin in the Bible as Read Today	31		
Acceptance of Evolution by Pope John Paul II	32		
Using Literary Forms to Study the Bible	33		
The Story of Adam and Eve	34		
Original Sin in the Old Testament	38		
Original Sin in the New Testament—The Pauline Literature	39		
Greek Fathers on Grace and Original Sin	41		
Saint Augustine on Original Sin	43		
The Council of Trent	44		
Some Contemporary Approaches to Original Sin	45		
Are Nature and Grace Two Independent Hierarchies?	50		

Introduction

Original sin: the phrase summons up quaint images of snakes and apples, of ruler-wielding nuns and the Baltimore Catechism.* When was the last time "original sin" was the answer to any question actually arising in your life? Was there ever a time when it did not raise more questions than it answered? Why dredge it up again now, in this age of science and sophistication?

Original sin, the idea that death, suffering, and evil in the world are the result of a sin committed by the first human beings, is peculiar among Christian doctrines. It is not about God so much as about the human condition; yet it has been presented as the rationale for the whole idea of redemption by Christ—the very essence of Christianity. G. K. Chesterton called it "the only part of Christian theology which can really be proved"; yet, to many people, it seems illogical, unjust, and inconsistent with other elements of Christian faith. People instinctively feel that in some mysterious way it is profoundly true; yet it is tied up with unhealthy attitudes of guilt, and seems to squarely contradict scientists' understanding of evolution. What good is it?

Historically, original sin was a classic attempt to deal with very deep, immediate, and enduring human concerns, ones that every thinking person still wrestles with: the facts of evil and suffering in a world supposedly ruled by a good and all-powerful God; the conflict between our own good and bad impulses; the basis of morality; and the meaning of human life. But original sin was an answer to these problems that came out of a worldview differing in crucial ways from today's. Can it be salvaged, or must it be altogether scrapped?

In this guide we recount the history of this doctrine, discuss what theologians are saying about it today, describe evidence from evolutionary biology that gives important new insights into human nature, and outline a new way of thinking about original sin that does justice to both modern science and the Christian tradition.

We take the position that although the story of Adam and Eve can no longer be understood as literal history, the doctrine of original sin itself is more clearly true now than ever before. The doctrine of original sin remains central to the Christian view of our nature and our need for salvation. While not derivable from science, it is fully in accord with scientists' present understanding of the cosmos and humanity.

From this standpoint, elucidated in the following pages, we can begin to answer such questions as the following:

- Was the creation really "good" in the beginning?
- How good am I?
- What does it mean to be made in the "image of God"?
- Did Adam and Eve really exist? Was there a "Fall"?
- How can the creation accounts in Genesis be understood in a scientific age?
- Is "original sin" relevant today?

Evolution According to Contemporary Science

by Daryl P. Domning

Many devout Christians today believe that the story of creation found in the biblical book of Genesis must be taken literally (as indicating direct divine creation of the world in six 24-hour days only a few thousand years ago), or else the authority of scripture as a whole will be undermined. The fathers of the early church,* however, understood the biblical "six-day" creation story metaphorically. Nonetheless, as the natural sciences developed in the West after the Middle Ages, and for lack of any obvious evidence to the contrary, the account of our origins given in Genesis 1-3 did come to be taken literally by natural scientists as well as by theologians. The events of the Reformation* and Counter-Reformation,* including the Council of Trent* in the sixteenth century and the condemnation of Galileo* in the seventeenth, did nothing to encourage departures from this literalism, which remained the norm down to the nineteenth century.

At that time, discoveries in geology and biology by Hutton, Lyell, Wallace, Darwin, and others initiated a major upheaval in our views of human nature and prehistory. The idea of a six-day creation mere millennia in the past was shattered once and for all, giving way to a timescale for creation measured in billions of years.

Later, discoveries in nuclear physics made possible the development of radiometric dating and the actual measurement of when, during all those billions of years, specific natural events had occurred. Included among those events were radical rearrangements of the Earth's surface, with seas, mountains, climatic zones, and even entire continents shifting about as easily as stage scenery in an ever grander and lengthier play. Even the sequence of events recounted in Genesis 1-2 proved irreconcilable with the Earth's actual history as recorded by rocks and fossils.

Meanwhile, astronomy and astrophysics vastly expanded our understanding of space and time in the universe. We and our planet shrank to very small specks in a very big world, whose beginnings were very far removed in every way from our present state of affairs. The notion of the Earth and humanity being in any sense the center of this geometrically centerless universe came to look less and less tenable.

With these ever-expanding gulfs of time and space between the world's origin and ourselves, believers in a Creator began to think in terms of a creative process—natural laws acting over time—rather than direct divine fiat to describe Creation. The successful explication of these laws by Newton, Einstein, and the physical sciences in general drew around all of nature a firm line, within which God's direct tinkering was no longer required. If the Creator, in this view, had not necessarily lost interest in the material world, He or She had at least put its day-to-day operation on automatic pilot.

How Has Life Evolved?

Most unsettling of all, scientists discovered that, when viewed on a timescale of millions of years, the kinds of living things we see all around us are as unstable as

the eroding rocks and moving continents beneath our feet. Far from having been specially created in anything like their present forms, all living things have descended from one or a few common ancestors that likely resembled bacteria more than anything else we know.

From these unpromising beginnings, they were slowly modified along constantly splitting lines of descent to yield the exuberant diversity of life we see today. Along the way, moreover, countless forms were ruthlessly eliminated. Even diverse groups of creatures that dominated the Earth successfully for scores of millions of years, such as the dinosaurs, ended up on the same fossil heap with the shortest-lived evolutionary failures.

Furthermore, although humans have not yet produced life from nonliving matter in the laboratory, many scientists today are confident that we will achieve this, along with explanations of how life could have arisen naturally on the primordial Earth—and probably on countless other planets as well.

To make clear how evolution does and does not relate to theology, we need to summarize the twentieth- and twenty-first-century understanding of Darwinism embodied in the so-called "Neo-Darwinian Synthesis"* or "synthetic theory of evolution."*¹ This theory² is extremely well supported by scientific evidence, and many consider it a grave threat to the Christian worldview. But even this most uncompromising, hardcore version of evolution, allegedly the believer's worst nightmare, is entirely compatible with Christian faith. And although neither the pattern nor the process of the unfolding evolutionary panorama seems to hold out much comfort to the traditional view of divine providence, the core mechanism of the evolutionary process has profound and fruitful implications for theology, especially the doctrine of original sin.



Electric Jellyfish

What Is a Theory?

Let's dispose of some semantic confusion about evolution being "just a theory" and not a "fact." In common parlance, a "theory" is often no better than a guess, and hence the weakest of assertions—what a scientist would call a mere "hypothesis". But scientists themselves consider a theory to be one of the *strongest* of assertions, so well tested and supported by so many facts that it is actually more worthy of

belief (and harder to refute) than any single "fact" or observation that contributes to it. A theory in this sense could even be called a "metafact," a fact about facts: it is not only itself true beyond reasonable doubt, it also explains and gives meaning to a multitude of relatively trivial, seemingly unrelated facts.

Thus, the atomic theory, the theory of relativity, quantum theory, the heliocentric theory, and the germ theory of disease are correctly spoken of as theories, and at the same time they are among the biggest, best-supported *facts* we know. They are true only within limits (relativity and quantum mechanics will someday be subsumed under a more general theory; the sun is only the center of our solar system, not of the whole universe; some but not all maladies are caused by germs), but within those limits they are incontrovertibly true.

Evolution As a Theory. Likewise, evolution (Darwin's "descent with modification") is both a theory in the strictest sense, and a rock-solid fact. All organisms living today have evolved from past ones that were very different. Darwin's more specific theory of natural selection (his explanation of *how* evolution occurs) is also a well-tested theory, as well as a fact as far as it goes (natural selection does occur and does produce adaptation and evolution). The only thing biologists still argue about is whether it explains all adaptive evolution.

Observations, facts, hypotheses, and theories in science always remain, in principle, subject to rechecking, retesting, and fine-tuning, but once theories have passed as many tests as Darwin's, they are fully entitled to be ranked among the best-established *facts* we have.



Chimpanzee

The Darwinian Understanding of Evolution

Given the overall factuality of evolution, we naturally seek meaningful *patterns* among the lesser facts of life's history that the theory, or "metafact," of evolution organizes and explains. But evolutionary patterns are not the clear, straight-line trends that seekers of an underlying plan or purpose often expect to see. Instead, the family "tree" of life resembles a bush that has branched and spread more or less equally in many directions. Our large brains and self-conscious intelligence, however important in our own eyes, can be seen as just the peculiar specializations of one evolving lineage among countless others, and no more nor less a cause for wonder

than the longevity of the giant sequoia or the whale's mastery of the deep.

The dominant impression one gets of the organic world is that, in its production of such myriads of insect and other species, *diversity* seems to have been an end in itself. When asked what he could infer from his study of nature about the attributes of the Creator, the great geneticist J. B. S. Haldane is said to have replied, "an inordinate fondness for beetles."

To those seeking purpose in nature, the process of evolution has proven even more distasteful than its pattern. Once organic evolution was demonstrated by paleontology and other disciplines, a central problem of biology was to explain why organisms are so well adapted to their surroundings that they appear specifically tailored to those surroundings by an intelligent Designer. Virtually all biologists now agree with Darwin that adaptations arise ultimately out of two basic processes, today called mutation* and natural selection.*³

Mutation refers to changes in the genetic material of living things: chromosomes and other gene-bearing structures within living cells, and the self-replicating molecules, DNA and RNA, that make up the genes and store and decode the instructions for the assembly and functioning of the complete organism. Mutations are changes in the genotype (the genetic code of an individual) that result from accidental damage (caused by exposure to radiation, chemicals, or other agents) or from mistakes made in copying the code during cell reproduction. They resemble typographical errors, or the sorts of damage that can degrade the information stored on magnetic tapes or computer disks.

Mutations in themselves are thought to occur by "chance." This does not mean they do not have causes (some possible causes were named just above), but that their causes have nothing to do with the organism's needs for adaptation to its environment at that moment: the changes are *random with respect to adaptation*. A mutation that would benefit a population of organisms is not more likely to occur simply because it would be useful. The vast majority of mutations are in fact harmful or neutral, as would be expected of changes made at random to any finely tuned mechanism. Only rarely will such random changes result in a useful innovation. However, given that the dice are being thrown constantly, among hordes of members of each species in each generation, and continuously over millions of years, winning combinations are bound to occur with some frequency.

Furthermore, in sexually reproducing species, even many combinations that are not immediate winners are kept on hand for possible future use as part of the large hidden store of genetic variation that is held in every naturally-occurring population, but not expressed in the phenotype* (the visible makeup of an individual). This stored variation, originally produced by mutation,* is constantly (and randomly) being unmasked by the process known as recombination*—a sort of reshuffling of the cards in the genetic deck as part of the process of sexual reproduction—and manifested outwardly in members of a new generation, potentially influencing how they live and how well they survive and reproduce.

Mutation and recombination together create the variations that characterize every natural population. These "variations," however, are not mere departures from some ideal norm which constitutes the "essence" of a species. One of the key insights of Darwinism is that there are no such "essences": real species and populations are nothing but collections of variations, embodied in groups of actually or potentially

interbreeding individuals, within which the "norm" is merely the statistical average of the members of the group at a given moment. Because this statistical "norm" can shift indefinitely, the species can evolve.

In Darwinian theory, adaptation—useful change to genetic information—results from interplay of the *chance* factors of mutation and recombination with an anti-chance factor: *natural selection*. This is analogous to the artificial selection exercised by animal and plant breeders. In the case of natural selection, the organism's environment—both physical conditions and other living things, including members of its own species—plays the role of breeder.

Every species can potentially produce far more offspring than can possibly survive on a finite planet, and therefore these offspring must compete (with each other and with other species) for limited resources. Since the offspring virtually always vary among themselves genetically in ways that are relevant to success in this competition, it is inevitable, in an actuarial sense, that those that by chance are better equipped for survival will tend to leave more offspring in the following generation. Hence, any heritable characteristic that enhances their number and survival will automatically tend to be preserved and to spread in the population with each successive generation.

Like artificial selection, natural selection can thus be described as the *nonrandom reproduction of random variants*: only the "fittest" survive and reproduce, with "fitness" or competitive ability defined pragmatically in terms of effectiveness of engineering and efficiency of function.

Darwinian evolution involves processes operating simultaneously on at least three levels: the genes mutate, the individuals are selected, and as a result the population evolves. An individual *develops* from conception to death, but does not evolve; its genetic makeup is fixed throughout its lifetime. Only through turnover of individuals in the population—by birth, death, and migration—does the gene pool change. Eventually, with the passage of much time, the population's new range of variation may have little or no overlap with its old range. This change of gene frequencies within a population, and this alone, is evolution.*

The genetic code is constantly being revised, not by an intelligent designer but by that very environment to which the organism must immediately adapt. The environment itself sees to it that only the adequately-adapted live and reproduce. The survivors' level of adaptation thus remains adequate or even improves with time. It never, however, becomes "perfect"; natural selection can be expected to produce only adequate adaptations that are equal to or better than those of an organism's actual competitors. *Importantly, adaptation is only to present conditions, since natural selection—narrowly focused on short-term advantage—cannot foresee the future.*

In the Darwinian view, the beautifully simple mechanism of natural selection is all that is required to produce, from the raw material of chance genetic variation, all the adaptations of all the living things we observe. Indeed, it functions automatically in every system that involves imperfect copying of information and exposure of the results to competition for survival and reproduction. It is even being used to design industrial products and computer software. There is no doubt that natural selection works, and no way to stop it from working in natural populations—as shown by the rapid evolution of resistance to antibiotics on the part of disease-causing microbes,

and of pesticide resistance on the part of insect pests.

According to Darwinian theory, therefore, individuals do whatever they can to ensure their own survival in the broadest sense: not only (and not necessarily) by maximizing their own lifespans, but by maximizing the numbers of copies of themselves in the next generation. (The technical expression for this is maximizing one's "Darwinian fitness".) In most cases, this is best done by producing more offspring, each of which typically embodies half or more of a parent's genetic information. However, even a very incomplete copy of one's own genetic code confers more immortality than no copy at all, so outwardly altruistic behavior that benefits an individual's siblings, their offspring, or even more distant relatives can also help to perpetuate that individual's own genes, in proportion to the degree of genetic relationship (i.e., similarity). By promoting the reproduction of close kin, an individual perpetuates copies of some of its own genes as well. This maximizes what biologists call its inclusive fitness*—a more subtle and "farsighted" manifestation of "Darwinian fitness". This refinement of natural selection is known as kin selection.*

Altruism plays a role in natural selection.

But not even genetic relatedness preempts self-interest. Siblings compete, notoriously, despite their close kinship. A mother of any species readily sacrifices her life for a single offspring when it is the only one she has any hope of leaving; but in other circumstances the interests of mother and young can be opposed, and the same Darwinian logic can dictate a different strategy. In time of famine, for example, a young female may not only suppress ovulation but may spontaneously abort or abandon (or even eat) an offspring whose nutritional demands jeopardize her own survival, if she can thereby gain the chance to live and breed again another day.

The reproductive strategies of parents can likewise conflict. For example, the father's genetic interests may be served best by large, robust young, but the mother who has to bear and feed them may incur less risk to her health and her own genetic investment if the young are smaller. Both sexes choose mates with an eye to their own reproductive advantage; but even when females are coerced into copulating, they may still have numerous ways to control which sperm of which males fertilize their eggs, or which eggs or offspring develop to maturity.⁴ The result: a dynamic state of competition, compromise, and coevolution of reproductive attributes by each sex in response to adaptations in the other. *Competition, in short, is pervasive; an individual cooperates with another only when (and only to the extent that) this promotes its own interests better than any other option.*

Cooperation, in consequence, is also pervasive in nature, because it so often benefits all concerned. Many cases, especially in "higher" animals, can be explained by reciprocal altruism*: I'll scratch your back because you scratched mine yesterday and may do so again tomorrow, even if we are unrelated. This kind of "doing unto others" is quite in accord with selection theory, since it is obviously motivated by self-interest. But in contrast to kin selection, it involves an essentially economic rather than genetic exchange, and is therefore less direct and more vulnerable to abuse by individuals who accept benefits but don't reciprocate

This insistence on the role of *individual* advantage is perhaps the most distinctive characteristic of neo-Darwinian theory. Whether selection can ever favor the interests of groups at the expense of the individuals in those groups is still controversial, but to the neo-Darwinian, the individual organism is the most important, if not the only, unit on which selection acts, and individual self-interest

accordingly dominates the evolutionary process.

Putting it in the most general terms possible, *each living organism, even the simplest, consciously or unconsciously seeks (in competition with others) to maximize its own share and control of the available energy and resources, and to apply these to its own survival, growth, and reproduction.* It has been programmed to do this by that influence of its environment called natural selection, which is the "designer" or "programmer" that has gradually "written" the genetic code of its population and continues to maintain and upgrade it as environmental conditions change.

Darwinian evolution is driven by selection for individual advantage.

Thus, this powerful force of natural selection has, from the very dawn of life, worked constantly and automatically to create, and then to enforce, biological functions and behaviors that are directed toward *self-perpetuation*, in the broadest sense, on the part of all things living. The genetically-programmed drive to perpetuate oneself and one's posterity, and to sustain this effort by arrogating to oneself as much energy and resources as possible, is the most basic and necessary of all instincts, and therefore inseparable from the very notion of life. Because this drive is patently self-centered and ultimately (in a world of finite resources) succeeds only at the expense of others, there is no violence to language in calling it, in the simplest, most objective, non-psychological and non-pejorative sense, *selfish*.

The Evolutionary Roles of Pain, Suffering, and Death

Whereas many interpret Genesis 1-3 as attributing all physical suffering and death to the sin of Adam, the fossil record shows that living creatures not only died, but killed and ate each other, and even competed in evolutionary "arms races," for hundreds of millions of years before the first human sin. Such endless ages of "nature red in tooth and claw" scandalize many thinking people. Unlike most of the violence in our TV shows, however, these eons of bloodshed were not gratuitous, but absolutely unavoidable given the ground rules of Darwinian evolution. Nor are pain and death merely unfortunate by-products of the process: they play essential, *constructive* roles in the evolution of life.

Pain and suffering. Physical suffering results from the ability to feel pain. Pain is an alarm that warns animals away from the danger of injury, and conditions them to avoid similar dangers in the future. Unwelcome stimulation of sense organs through accident, disease, or environmental conditions causes discomfort (pain, heat, cold, fever, nausea, even anxiety) that may serve no apparent purpose; but this is deceiving. For example, we may vomit even when no really dangerous poison is in our stomachs, but this is erring on the safe side. Anxiety repels us from danger and drives us to seek companionship and security in numbers. This could have stimulated the evolution of our strong social bonds—an unexpected dividend from an emotion we tend to list among life's liabilities.

Pain, suffering, and death pave the way for humanity

Suffering may also occur as an unavoidable by-product of normal and vital functions—such as human childbirth, which is painful and risky to a degree unique among mammals. This came about in human evolution because of conflicting selective pressures for efficient bipedal locomotion in adults (which calls for a narrow pelvis) and for a larger brain in their offspring (which requires a wider pelvis for the

child's head to pass through). The anatomy of human females today represents an evolutionary compromise that is uncomfortable, to put it mildly. But the payoffs are hands free for toolmaking, and a human brain to guide them. Suffering, then, may have been inseparable from both our physical and our social evolution—which is to say, to the origins of our very humanity.

Death. And as for death: life could not spread and evolve on a finite planet if death did not recycle space, energy, and materials, and cull undesirable genes from populations. Death may even be of adaptive value to those that die. After giving its offspring a start in life, an individual may sometimes best help them by dying and getting out of their way. If the individual belongs to a tightly-knit collective of close kin (like an ant colony), kin selection may lead it to sacrifice its own reproduction, or even its life, to benefit its siblings and their offspring. In the extreme case, this collective is a multicellular organism like each of us—made up of genetically identical cells each liable to death, a death distinct from (yet connected to) that of the organism as a whole (see Clark 1996 for an excellent discussion).

As single cells evolved to form multicellular organisms, normal growth and function required that some cells self-destruct according to precise, genetically-programmed timetables. Hence, a tadpole's tail is deleted as it transforms into a frog, and the cells lining a woman's uterus die and are shed on a monthly schedule. Flowers fade quickly once pollinated so the plant's energy can be channeled into producing fruit and seeds. (This programmed suicide of cells is called apoptosis*—literally "dropping off," as with flower petals or autumn leaves.) Cell death even creates important body parts that are permanent or constantly renewed, such as the corneas and lenses of our eyes and our outermost layer of skin. Cells of the immune system that destroy invading microbes or the body's own mutated, possibly cancerous cells (often by inducing them to self-destruct) also destroy themselves if they fail to find a suitable target.

Another big reason why cells self-destruct is because they have suffered damage, especially to their DNA, that exceeds their capacity for self-repair. Because such damage tends to accumulate over time as the DNA is copied and recopied during cell division and metabolism, programmed cell death turns out to be intimately involved in senescence, or aging.

Surprisingly, aging is not always, and has not always been, an inevitable part of life. The earliest single-celled organisms, like modern bacteria, reproduced by asexual cell division. Such an organism—a single cell—never truly dies as long as it keeps dividing; barring accidental death, it is in effect immortal. Programmed death evolved at about the same time as sexual reproduction, back when our ancestors were still single-celled, perhaps a billion years after the origin of life.

Sex speeded up evolution by increasing genetic variety. Together with multicellularity, it made possible the large, complex, versatile kinds of creatures that we ourselves are and that we see around us today. But one cost of this complexity was increased wear and tear on the DNA "instruction manuals" in each of the body's cells during a lengthier growth and life span. Constant "reading" of these "manuals" by the machinery in the body's cells, plus other sources of cumulative damage, eventually degrades the DNA molecules till they are not fit to be copied for the next generation. Thus it became necessary to sequester pristine copies of each individual's DNA (for example, in the germ cells*), to be consulted only at the time of reproduction and not for "everyday use."

The DNA in the "somatic*" cells making up the rest of the body then became, in a sense, expendable. These somatic copies of the DNA are not only at greater risk of damage, but are reproductively irrelevant; they are never passed on to offspring. From the viewpoint of the "selfish genes," the bodies these somatic copies construct serve only to pass on the DNA in the germ cells: in the biologist's cliché, a chicken is just an egg's way of making more eggs. When the somatic cells are too far gone to use or repair (hopefully, after reproduction has occurred), they simply die. *Unfortunately, these somatic cells are us:* our bodies, including especially our brains. Inevitable aging and death are a price we pay for having evolved to a certain level of bodily complexity.

The Significance of Consciousness

Without millions of years of suffering and death of all sorts, including our own, our consciousness could therefore not exist. But is this consciousness just another of DNA's devices for mindlessly making more DNA, and devoid of any larger importance? Not necessarily. DNA itself is only a means to an end, only a storage medium, like a computer disk, that cells themselves invented to preserve their most useful evolutionary innovations. What is truly fundamental, and potentially immortal, is the *information* that DNA encodes. As we have learned from the rise of computer viruses, which (unlike DNA molecules or real viruses) are not material objects, pure information can use matter and energy to propagate itself. DNA is just one of information's ways of making more information—i.e., more copies of itself, even improved ones thanks to natural selection.

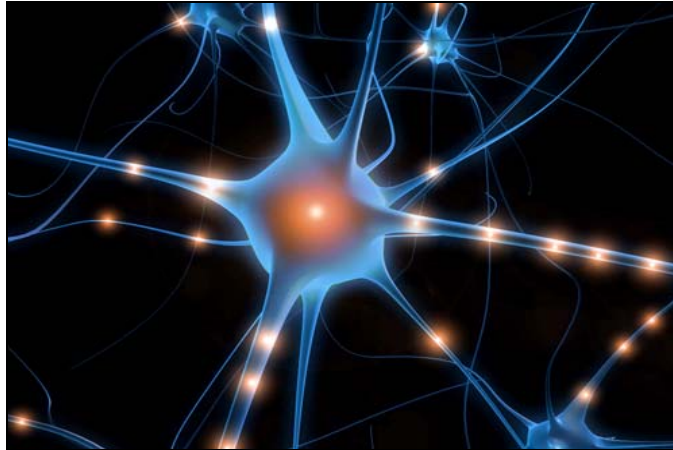
Then what is to prevent evolution from pioneering new ways to create and preserve information—new operating systems and storage media, in other words, like those that make our computers obsolete every few years? It has done so in the past. For example, the evolution of sex provided a quantum leap in the generation of genetic variety. Later, the evolution of culture allowed invention and exchange of adaptive information to occur far faster than was possible by genetic means. *But culture is an artifact of precisely those brains which seemed a moment ago to be no more than collections of expendable somatic cells.*

Our brains: By-product or breakthrough?

Such radical flip-flops in the functions and relative adaptive values of traits seem to be the usual way in which evolutionary novelties arise. A set of gill supports that aids in breathing and filter-feeding in a primitive jawless fish takes on a subsidiary function supporting the margins of the nearby mouth. Eventually it is transformed into jaws, setting subsequent vertebrate evolution onto an entirely different, predatory track. Eons later, the bones forming a reptile's jaw joint happen to lie so close to the eardrum that they fortuitously help conduct sound waves to the ear. When an overhaul of the chewing mechanism renders these bones superfluous as parts of the jaws, they are opportunistically drafted into full-time service as components of the new, improved mammalian hearing system. And so on. What begins as a minor, subsidiary structure or function regularly ends up as the dominant feature of a new flowering of evolutionary success, with the most far-reaching consequences.

There is, then, nothing strange in somatic cells having found a way to reproduce information that is even more efficient than that of the germ cells. In humans, this

new somatic-based, "cultural" adaptive mechanism quickly overshadowed in importance the genetic mechanisms of evolution. As a result, the somatic (in this case brain) cells responsible for this new, non-DNA-based mechanism of information storage and transmission can be seen to be more than mere "vehicles of DNA." The self-conscious intelligence and culture they create can accordingly be seen, even in purely Darwinian terms, as a major evolutionary breakthrough.



Neurone Cell

Does Evolution Exclude God, Meaning, and Purpose?

The belief that evolution cannot accommodate God, meaning, and purpose feeds the most profound objection to the evolutionary account of our origins, and the one that truly motivates most of the sincere theists who reject evolution or the Darwinian account of it. The real issue for them is the fear that Darwinism undermines the very meaningfulness of human existence.

But it does not. First, even if God's existence is denied, a moral and meaningful life is still possible. Many atheists profess to find meaning in love of family, beauties of art and nature, work well done, and other good things; and they can live moral lives in which they find value and pursue good purposes of their own choosing.

In fact, the supposedly "godless" evolutionary viewpoint can even give us all a more honest understanding of ourselves. It reveals that our "morality" cobbles together high-minded philosophy and religious ideals with lowly self-interest, social conventions, and canny politics, the joints between these being whitewashed over with hypocrisy. Realizing how mixed our bag of motives is aids the examination we all need to make of our lives. If we ask, "How good am I?," we will find that the answer is "Not as good as you thought!"

Second, evolution does not make God unnecessary, despite the emphatic assertions of some prominent evolutionists. Evolutionary biology, like all other natural sciences, seeks to explain the workings of nature without invoking supernatural causes. But this is not a denial that the supernatural exists. In technical terms, this naturalism* of science is merely methodological and not metaphysical. If evolutionary science's naturalistic methodology is a problem for creationists, then they should be equally scandalized by automobile repair or computer design, which also assume that God does not

Does science exclude the supernatural?

intervene in the workings of the machine.

Furthermore, science cannot address the philosophical question of why anything at all exists; so when the theist asserts that God is necessary to explain the very existence of a physical world, legitimate natural science is simply unable to comment one way or the other.

The issue of purpose usually arises in the form of the question: What purpose or goal does the evolutionary process (or the evolutionist's universe) itself have? Believers understandably fear that the answer must be: "None." However, replacing the word "purpose" with "goal" (or "intention" or "desired result") makes it clearer that purpose implies some sort of consciousness, even if only a very rudimentary one, in which the intention or desire resides. It follows that an impersonal, lifeless process of nature cannot be said to have a "goal" of its own choosing; it can only have effects, which are more or less predictable. Natural selection in itself has only the *effects* of constantly maintaining and maximizing the short-term ability to survive, and in the long term, of predictably generating by-products that include novelty, diversity, and ultimately (in isolated cases) intelligence. Individual organisms, in contrast, can and do have at least one goal toward which they universally and actively (even if unreflectively) strive, namely survival.

To the atheist, this is all there is to the story, but the theist will see at once that any overarching purpose or goal there may be for the evolutionary process and its products *as a whole* can properly be said to reside only in the mind of the Creator who uses this process as an instrument. The absence of a "purpose" *within the evolutionary process itself* need not mean that purpose is absent from the totality of all that is; we must simply not look for that purpose in the wrong places.

Finally, whatever self-chosen values the atheist may find meaningful, the theist can still accept revealed religion as a more explicit guide to what is good and willed by God. Acceptance of the essential tenets of the Judeo-Christian revelation is not precluded by an evolutionary understanding of creation—in fact it is facilitated by it. The conflict some perceive arises from misunderstanding the nature of scripture: the only plausible purpose of a communication as out-of-the-ordinary as divine revelation is to guide us out of our otherwise-insoluble existential problems, not to satisfy our idle curiosity about matters in nature that we can discover for ourselves.

Above all, the believer who looks forward to the fulfillment of God's promises will find an evolutionary outlook to be as congenial to his or her faith as could be desired. Being products of evolution means being active parts of something vastly bigger than ourselves: a divinely-willed ongoing creation, a continuous chain of life on Earth stretching over more than three and one-half billion years without an instant's interruption, and embraced in a still vaster universe some ten billion years older. Can such a display of divine patience and faithfulness, extended over such eons of unbroken continuity, fail to inspire confidence in the plans and promises of such a God?

To summarize the scientific understanding thus far: the vast extent and age of the universe, and the reality of cosmic and organic evolution, have been established beyond reasonable doubt. Darwinian natural selection remains unshaken as the cornerstone of modern biology. This powerful yet simple—and fundamentally *selfish*—process still appears both necessary and sufficient to solve what was once among the greatest puzzles of nature: how living things came to be so well adapted

to their environments.

Paradoxically, natural selection's relentless maximization of individual advantage can even explain the origins of altruism and the first steps toward true moral consciousness—the subject of "Evil, Ethics, and Values in an Evolving World." As we shall see, the inherent selfishness imposed by the evolutionary process is also the key to one of the greatest puzzles of Christian theology and anthropology: original sin.

Evolution According to Contemporary Science: Major Points

- The modern theory of evolution is not only a fact (thoroughly tested and true beyond reasonable doubt as far as it goes), but more worthy of belief than any single one of the multitude of lesser facts or observations that support it.
- The Neo-Darwinian or "Synthetic" theory of evolution holds that the adaptive evolution of living organisms results from the interplay of two basic processes: mutation and natural selection.
- Although mutations in the genetic material occur by "chance," the anti-chance factor of natural selection ensures that evolution as a whole is anything but random.
- Adaptation is only to present conditions, since natural selection—narrowly focused on short-term advantage—cannot foresee the future.
- Competition is pervasive; an individual cooperates with another only when (and only to the extent that) this promotes its own interests better than any other option.
- Each living organism, even the simplest, consciously or unconsciously seeks (in competition with others) to maximize its own share and control of the available energy and resources, and to apply these to its own survival, growth, and reproduction.
- Neo-Darwinian theory insists that natural selection tends to maximize individual, rather than group, advantage. It thereby enforces selfish, or self-centered, behavior on all living things, although cooperative strategies often offer the best way to attain individual goals.
- Physical life as we know it would simply not work in the absence of pain, suffering, and death, which play essential, constructive roles in life.
- Inevitable aging and death are a price we pay for having evolved to a certain level of bodily complexity.
- What is truly fundamental about DNA, and potentially immortal, is the information that the DNA encodes.
- Culture, presently our major means of adaptation to our environments, is an artifact of our brains, which are collections of somatic cells as opposed to germ cells. This reflects a radical shift in the relative importance of somatic and germ cells as media of information innovation, storage, and transmission.

- Science cannot address the philosophical question of why anything at all exists; so when the theist asserts that God is necessary to explain the very existence of a physical world, authentic natural science is simply unable to comment one way or the other.
- The absence of a "purpose" within the evolutionary process itself need not mean that purpose is absent from the totality of all that is; we must simply not look for that purpose in the wrong places.

Evolution According to Contemporary Science: Discussion Questions

- Does the explanation of Darwinian theory given here differ from how you understood it before? If so, in what way(s)? Given this explanation, does evolution now seem more problematical to you, or less?
- The author asserts that physical life without suffering and even death would be unworkable. Do you agree?
- What purpose or goal does the evolutionary process (or the evolutionist's universe) itself have? Do products such as novelty, diversity, or beauty seem sufficient to justify the evolutionary process?
- Do you see a conflict between seeing yourself as having evolved from "lower" animals and considering yourself as being made in the image of God? Why or why not?
- Do you feel, if evolution is true, that God must not exist, or that life can have no purpose or meaning? Why or why not?
- Charles Darwin felt that there is "grandeur" in the evolutionary view of life. Do you agree?
- Do you think that the material universe is sufficiently good, noble, and able to bring forth by itself human life, intellect, and free will? Do you think Jesus would agree that matter is worthy of this much respect?



Double Helix

Evil, Ethics, and Human Values in an Evolving World

by Daryl P. Domning

Given the conclusions of natural science outlined in Part 1, theologians today have no alternative but to accept evolution as the method God used to create the wonderful diversity of living things on this planet—the world of nature that God finally pronounced "very good" (Genesis 1:31⁵).

This, however, leads at once to a major paradox. Associating God with "evolution red in tooth and claw" raises serious problems for theodicy* in the minds of many people. Are we to understand that physical suffering and death, which we have always labeled "evil," can not only be willed by God, but can even be pronounced "very good"? Even if suffering and death are unavoidable, indeed necessary to the evolutionary process, can they possibly be seen as having some positive value? Or must we reject as flawed and false any worldview that has such abhorrent logical consequences?

Here we encounter what philosophers call the "problem of evil," and with it the traditional Christian explanation of evil: original sin.* What possible form might these concepts take when transposed into an evolutionary worldview? Is there any place in an evolving world for values or ethics that Christians would recognize?



Dinosaur Skull

The Selfish Behavior of Primates and Other Animals

As we saw in "Evolution According to Contemporary Science," *selfish* behavior of some sort, whether in a literal or an abstract sense of "behavior" (and in the evolutionary but not necessarily the psychological sense of "selfish"), is the mainspring of Darwinian evolution. To understand the origins of our own selfish and sinful actions, it is worth considering the behavior of those "subhuman" creatures most similar to ourselves.

Modern studies of animal (especially primate) behavior offer the theologian much challenging food for thought. They show that practically all of the overt acts regarded as "sinful" in humans are part of the normal, natural repertoire of behavior in other species. For example, the pioneering studies of wild chimpanzees by Jane Goodall and others have revealed that these animals naturally engage in acts ranging from

petty quarreling, bullying, and theft, to deliberate deception; political intrigue; premeditated murder (even serial killings) of members of their own species; systematic infanticide and cannibalism; and organized, aggressive, and lethal warfare against neighboring groups. Even prideful behavior, proverbially the deadliest of all, is not absent: when seeking to make up after a fight, chimpanzees use not only third-party mediation but elaborate, mutually-agreed-upon public pretense simply to save face (de Waal 1989, 238-239). Nor is it necessarily even the case that their abilities in such regards are inferior to our own: "Deception seems to permeate all aspects of chimpanzee social life, and chimpanzee skills in deceit are a match for human lie-detecting abilities" (de Waal 1986, 240).

Many of these unattractive, self-centered traits have also been observed in bonobos, gorillas, and the other great apes. Monkeys too are practiced in deceit, status-seeking, and interfamily vendettas. Indeed, it is hard to think of any form of human misbehavior that is not somehow foreshadowed among other primates. And many of these practices pervade the animal kingdom as a whole. This is conspicuously true of intraspecific killing, cannibalism, and infanticide, as well as deception. Though not morally responsible for their actions or guilty of "sin," these creatures behave in ways no different than we do, and for reasons plainly explicable in Darwinian terms. Such behavior has "selective value"; it benefits them as individuals in terms of their own survival and reproduction. It is "selfish," it is effective, and it is consequently enforced by natural selection, as was explained in "Evolution According to Contemporary Science."

Do animals commit sin?

How do we explain shared traits among animals? Whatever their inner workings, these acts of animals do bear an uncomfortable outward resemblance to our own worst efforts. What are we to make of this? The evolutionary biologist will apply to these data the principle of parsimony*: barring evidence to the contrary, detailed resemblances good and bad between species are most plausibly and economically explained by inheritance from a common ancestor, rather than by independent acquisition of the similar traits. Similar behavior among the higher primates, including humans, is most logically and straightforwardly explained as a common legacy retained from an earlier stage of evolution, rather than as a set of traits separately evolved by these different species. Hence it is legitimate (parsimonious) to apply the term "selfish," in the evolutionary (non-psychological) sense, to both humans and other organisms.

Likewise, the human behavior patterns denoted by our words "murder," "theft," "deceit," "possessiveness," etc., are shared with other species precisely because the common ancestor of all these species possessed them. In biologists' jargon, the selfish acts of humans and other species are homologous*: similar because derived from a common source. While the same logic also applies to our more amiable traits, here we are concerned not with human behavior in general but with its dark side, sin, in particular.

The common source of our and other species' selfish acts must therefore be a nonhuman common ancestor. It cannot be any "sin of Adam" or otherwise identified with the biblical Adam and Eve. The heritage in question is far more ancient than the earliest apes, or primates, or even animals or plants. The primate behaviors that are homologous with our human sins are no more than particular (albeit dramatic) instances of the "selfishness" that, in its broadest, evolutionary sense, is the common heritage of all life—animals, plants, even the lowliest microbes. And we can certainly suppose that Adam was not the first bacterium! Rather, *we must conclude*

that the first human beings were simply far too late on the scene to have been the originators of the unpleasant overt behaviors that in our species alone, through our moral choices, took on the character of sins.

What about morality, love, and care? If morality, love, and care are also anciently rooted in our evolutionary history, why might not they, rather than selfishness, be described as the central (or at least an equal) driving force of evolution? The answer is that they are indeed ancient, but not as ancient (or as fundamental) as selfishness. The self-interest of organisms has repeatedly led them to cooperate, even at the most primitive levels. This cooperation gave rise to altruism (at least of a limited sort). Selfish behavior, even cooperative behavior, is compatible with unconscious, mechanical programming (as has been demonstrated in computer simulations). But true altruism (if it exists in nature at all) requires consciousness of another's existence and needs, empathy with that other's situation, and a decision to act despite the cost to oneself. True altruism therefore presupposes an intellect and will of a caliber that cannot exist in the simplest life forms, and could not have been there at life's beginnings. The origins of altruism can thus be explained in terms of selfishness, but not vice versa. Self-interested cooperation is still self-interested, and is thus a very long way from what we like to think of as true altruism: in Jesus' words, laying down one's life for one's friends (John 15:13).

Is this genetic determinism? Since most "lower" creatures have no cultural mode of inheritance on which we can blame their selfish behavior, they must have a genetic predisposition to act in self-serving ways. And that same predisposition must still be there in us, no matter how deeply buried under the later accretions of culture and mental versatility which dominate our overt behavior (and which can, if we choose, keep those old instincts from surfacing). Human free will can override whatever genetic (or learned) leanings we possess, so we are not exclusively and inevitably programmed by our genes to lie, kill, or steal. Our bad behavior is no more and no less "determined" from the perspective of evolution than under the traditional doctrine of original sin. Our self-preservation instincts may point us in such directions, and the culture around us may reinforce or counteract those tendencies, but in the end, the DNA doesn't make us do it. Truly ethical behavior requires freedom from genetic or any other kind of compulsion. All the same, this ethically necessary freedom can resist a certain amount of pressure, short of absolute compulsion—just as gravity draws me powerfully toward the center of the Earth, but I can still choose to climb a ladder, even if it takes some effort.

Nature: The good, the bad, or the ugly? How could "selfishness," with all its negative connotations, be not only a part of God's creative plan but a necessary part, the very driving force of the whole creative process, all of whose products were pronounced "very good"? Evidently this purely biological, amoral "selfishness" has not only not been evil in itself: it has been positively good (in a natural, not moral, sense), since it was the means God employed to achieve a good result.

Many people, however, hold an opposite view: that there is eternal hostility between humanity and nature, between our ethical progress (even our survival) and a hostile cosmos. Like every deeply persuasive idea, this one has some truth to it. Our moral striving is clearly a striving against something, which I too argue is a phenomenon of nature: the natural selfishness built into our biological makeup. But to brand the entire universe as our implacable enemy is going too far. Our earthly and cosmic environments are stacked neither in our favor nor against it; though the universe permits life, it is otherwise

Can selfishness be good?

neutral toward it.⁶ And while we must struggle as we adapt to the conditions we encounter, the surrounding cosmos in no sense struggles back. It cannot be called our enemy, any more than the golf course is hostile to the frustrated golfer, no matter what paranoid fantasies enter his head. Challenging, yes; hostile, no. Even our inbred selfishness is morally neutral, aiding our survival even as it impedes our ethical advance.

It is time to put behind us the archaic notion that nature is our foe, to be battled and subdued: the Gnostic* and Manichaeian* idea that spirit must forever war against matter. St. Paul's interior struggle against his bodily nature (Romans 7:14-23) should be balanced with St. Francis of Assisi's more patient view of "Brother Ass." Even (perhaps especially) the atheist should have no trouble seeing that the universe is no more malevolent than it is benevolent. And to the theistic evolutionist, the indifferent stuff of the universe is but the medium and instrument of the Creator; it is no more the author (or the adversary) of created order than are the canvas and brush of the painter, or the stone and chisel of the sculptor. In calling the entire creation "very good," the Creator was not ascribing to it a moral quality that only moral agents can possess; its goodness is that of the admirable tool and the admirable work.

From a biblical perspective we can see the physical world—with its blind, "purposeless" Darwinian processes—as simply the servant unaware of what its Master is doing. Through the service of these blind processes, however, the Master has brought into being intelligent creatures, capable at last of understanding their Master's purposes and of being called no longer servants but friends (John 15:15).

God's purposes and evolution. Although we speak of God having purposes in mind for evolution, detailed divine "guidance" of the evolutionary process may have been quite unnecessary, despite the instinctive belief of many theistic evolutionists to the contrary. Scientists disagree on whether the evolution of either life or intelligence is likely to be common in the universe, but in my opinion, both will arise predictably under conditions that may plausibly exist on many planets. The universe as we are getting to know it is a natural hothouse for life, and for intelligent life. God does not need to step in and fiddle with things along the way to coax it into producing the moral equivalent of us. (Physical appearance may be much less predictable!)

This statement is in no way an acceptance of deism or of an idle God no longer concerned with the world. The autonomy of the universe, and the self-sufficient laws governing its evolution, support a truly biblical theology that envisions a self-humbling, self-emptying God of selfless love. The Creator "withdraws" from the world, inviting rather than commanding it, precisely because "love by its very nature cannot compel" (Haught 2000, 112). This withdrawal makes room for the Darwinian laws (unpleasant to us), which are the only laws we know of that can assemble the living things we see. *The Darwinian "messiness" epitomized in the sufferings of all living creatures, and the Creator's humility epitomized in the sufferings of Jesus, are two sides of the same coin.*

The Evolution of Ethics

It is usually a bad idea to try to derive the content of human ethics explicitly from evolutionary theory—for example, by arguing that natural selection means that only the strongest or "best" among us *should* survive. Besides, many attempts to construct such systems of "evolutionary ethics" have mistakenly assumed that naked

competition is the only rule of evolution. But competition of the crudest kind is merely the most basic, not the most refined, form of behavior through which natural selection can act. Until recently, biologists and ethicists were unaware that many kinds of cooperation occur along with competition in a wide range of species. Such cooperation should receive equal consideration in any system of evolutionary ethics.

Cooperation and competition together, by leading to social behavior, may even have made possible intelligence itself—and consequently ethics. Many biologists today think that primate and human intelligence, or at least important aspects of it, evolved in response to selective pressure for social sophistication that included cooperation, competition, and exploitation of others. In this view, our intelligence was molded less by the demands of physical survival, such as toolmaking and cooperative hunting, than by the psychological demands of social interaction and political gamesmanship.

Like all games, social and political life has rules, including those we call ethics. Because social living among primates is very ancient, it is probable that the overwhelming majority of human ethical principles (taboos against killing, stealing, deceit, and the like, at least within one's own social group) have deep evolutionary roots, whether they are handed down through our genes or through our learned social customs. Such ethical principles (and even more subtle ones) can be seen at work in many nonhuman animals today: reconciliation, consolation, succor, and even high-level "diplomacy" and peacemaking between leaders of warring groups are behaviors we would consider desirable, ethical, or virtuous in a human context (just as we would consider many of these same animals' selfish behaviors sinful in a human context). This should not be surprising, since ethics of some sort, including what de Waal (1996) calls community concern, are essential to the functioning of any society, animal or human. The Golden Rule, in the form of reciprocal altruism, is familiar to many of our fellow creatures.



Human/Dog Arm Embrace

Indeed, it would not even be surprising if some animals (like some humans) occasionally performed altruistic acts in the absence of any tangible payoff. Sympathy for one's associates had to start somewhere. For it to have evolved, some payoff must once have been present, but the actor need not have been conscious of or consciously motivated by it.

Do animals have ethics?

Consciously, there may have been only the satisfaction of helping another—a feeling from which our species has abstracted a moral principle, and then, by free will, internalized it as a duty. This would explain how genetic selfishness could become compatible with genuine altruism on the part of the conscious individual. Such a blurring of category boundaries—gradation between the "pure" extremes of selfishness and altruism yielding intermediate states in which matters and motives are decidedly mixed—is what one naturally expects to see in the course of evolution.

Judeo-Christian Ethics versus Darwinian Rules

While the evolution of our intelligence was producing more complex political, economic, military, and other communal expressions of selfishness, it also led naturally to the elaboration of diverse ethical systems. Ethical precepts gathered in collections of wise sayings are among the earliest known forms of human literature. From the *Instruction of Ptah-hotep** in the Egypt of 2450 BCE, to the writings of Confucius, Buddha, and the Greek philosophers of over two millennia later, the world of "pagan" antiquity enjoyed an abundance of edifying advice—not to mention codes of enforceable law, from Hammurabi* to the empires of China, Rome, and elsewhere.

What was left for the revealed religions to contribute? This is not as obvious as one might think. The Ten Commandments and the Bible's wisdom literature contain little that is not already found in the ethics of other traditions. Lying, stealing, killing, offenses against filial piety and marital fidelity, neglecting the cult of the gods—all these are universally reviled. At the risk of oversimplifying, it seems that the God of the Hebrew scriptures sought to accomplish little more at the outset than weaning the Hebrew children away from polytheism, human sacrifice, and temple prostitution, while getting them to practice the elementary ethics that the civilized peoples around them already preached. Beyond that, the numerous precepts of the Jewish Law served mainly to demarcate the people of Israel from other cultures and to provide them with concrete ways in which to show their devotion to their God.

Of course, the Jewish tradition only began, not ended, with the Law of Moses. For centuries thereafter, prophets such as Amos, Hosea, Isaiah, and Jeremiah strove to raise the moral standard above the merely legalistic and ritualistic, by developing the higher ideals that were implicit in the Law. But their success was mixed, and ritual and legalism remained central concerns.

Thus, over the ensuing centuries, the complexities of the Jewish Law occasioned much learned debate about the relative importance of what had become a host of distinct commandments. At length, a lawyer put the question to a rabbi named Jesus of Nazareth. His reply (Matthew 22:37-40) is a milestone in our ethical evolution. The greatest law, he said, is to love God (no surprise there); but the second-greatest is to love one's neighbor as oneself. Though not in itself original with Jesus (it is found in Leviticus 19:18, 33-34), that latter provision of the Law had until then been considered no more important than many others. Even though "neighbor" was usually construed narrowly in his culture to mean fellow countryman, for Jesus to give such prominence to this idea was downright novel from the Darwinian viewpoint. He placed the interests of others equal to one's own self-interest, and not just as sporadic generosity but as a consistent rule.

But then (as told in Luke 10:25-37) Jesus went on to drive home just how novel he

meant it to be. The lawyer, ever alert for loopholes, pressed him further: "And who is my neighbor?" The reply was the parable of the Good Samaritan. Today we may fail to appreciate that this parable's title is an oxymoron—as much so as a "good Indian" would have been in the nineteenth-century American West, or a "good Palestinian" to many Israelis today. Samaritans were despised enemies of the Jews. What Jesus meant was: "Who is your neighbor? Your enemy is your neighbor. Even the one you despise most is your neighbor. It is his interest that you are to set equal to your own." Furthermore, throughout his teaching, Jesus made clear that this pertained especially to the despised poor: in short, to those who not only would not, but could not, repay.

Here was something new. Here was altruism stripped of the very possibility of reciprocity. Like many of his predecessors, Jesus approved the Golden Rule, but it would be a serious mistake to reduce his teaching to this principle alone. If the rule of reciprocal altruism really sums up the Law and the Prophets (Matthew 7:12), then the Law of Moses had made only a small advance beyond the law of the jungle. It is one thing to say (or imply, as in Leviticus 19:33-34), "Treat others as you would have *them* treat *you*," which implies at least the possibility of reciprocity. But it is subtly different for Jesus to say, "Treat your neighbor as *you* treat *yourself*." Of course, when your "neighbor" is your kinsman, this latter injunction involves no more than classic kin selection: genetically, to a certain degree, your neighbor *is* yourself. But with his parable of the Good Samaritan, Jesus explicitly ruled out this sense of the word "neighbor." For him, "self" (on this concrete, biological level) is as different from neighbor as may be. And between you and your literal self, no question of reciprocity can arise.

Another significant aspect of Jesus' command is its clear premise that one should treat oneself *well*. Jesus and the Law of Moses both take it for granted that there is nothing tainted about proper esteem of oneself. Seen today from a Darwinian vantage point, this implies a reaffirmation of the basic goodness of human nature—indeed of the whole living creation—in which selfishness plays a central, creative role. Once noticed, this reaffirmation seems all the more striking for the offhand way it is slipped in: of course it is good and healthy and in accord with God's plan to love yourself! How could the world be otherwise? And yet, at the very moment in history when Jesus implicitly reaffirmed the goodness of the self-love that had gotten us to our present stage of evolution, he also explicitly called on us to leave behind that limited good in favor of something greater.

St. Paul, who wrestled at length (in Romans 5-8, Galatians 3-6, and elsewhere; cf. John 1:17) with the Mosaic Law's inability to offer salvation, was acutely conscious that Jesus had somehow changed radically the rules of the game: "if anyone is in Christ, he is a new creation. The old order has passed away; now all is new!" (2 Corinthians 5:17). And St. Paul knew where the change had been made: "The whole law has found its fulfillment in this one saying: 'You shall love your neighbor as yourself'" (Galatians 5:14, emphasis added). Just how fundamental this change was, though, perhaps not even St. Paul could see as clearly as can a modern evolutionist. Jesus had plainly told his followers to do nothing less than defy the ancient law of natural selection (cf. Matthew 5:43-48; Luke 6:35; Luke 9:23-24; Luke 14:26; Mark 3:32-35; Matthew 10:34-39; Matthew 19:21-26).

Though a reward is promised to the generous in Luke 14:12-14, its spiritual nature—approval by God, though quite likely ingratitude, even persecution, from humans—is as far removed from Darwinian rewards as is possible to imagine. In fact, the latter

rewards are to be consciously avoided! While evolutionary ethicists sometimes seek to explain altruism in terms of the value to the altruist of a good reputation, Jesus warned against even this subtle ploy (see Matthew 6:1-4). And just to underline the fact that this philosophy runs flatly contrary to the (Darwinian) way of the world, Jesus declares that he and his followers "do not belong to the world" (John 17:14).

In short, to follow Jesus is to obey his most basic command: "Reform your lives"—that is, change your whole way of thinking and acting and your whole approach to life (cf. Mark 1:15). It means rejecting much behavior that is genetically programmed as well as much that is culturally prescribed.

And Jesus did not stop at giving advice. He even modeled this new ethic in his own death, which he knowingly incurred by publicly shaming the powerful who neglected the needs of the powerless. He consciously and explicitly cast his death in the pattern of, and as a renewal of, the sacrifice that concluded the Covenant: the rapprochement or (re)conciliation between God and Israel (Matthew 26:28; cf. Exodus 24:4-8; Colossians 1:19-20). As he did, so are we to do (John 13:34). Thus the progression from "Treat others as you would have *them* treat you" to "Treat others as *you* treat yourself" to, finally, "Treat others as *I* treat you"—which is to say, with a totally disinterested altruism and the same lack of expectation of repayment that Jesus urged in Luke 14:12-14.

To disciples such as Paul, what was most astonishing in Jesus' self-sacrifice was his willingness to die for sinful humans (Romans 5:7-8). God/Christ—divine and in need of nothing—cannot be motivated even by the heavenly reward offered to us. His willingness to die in our service thus represents perfect altruism. This is incomprehensible to the "wisdom" of the world, because it is directly at odds with the Darwinian behavior manifested in the way of the world (cf. 1 Corinthians 1:18-20).

Just how original and unique was the total transcendence of self-interest in the life and teaching of Jesus? Perhaps it was only a small step from the limited, conditional altruism of previous ethical systems to the pure altruism of Jesus. Perhaps the idea of pure altruism can also be found in Buddhism or other faiths. That is a question for students of comparative religion. I think the relevant measure of this notion's "otherness" is that no matter where or how often this divine altruism has been revealed to us, even despite two millennia of "Christian" civilization it is still utterly foreign to our human nature (cf. John 8:23). The culture of Wall Street, the mentality of the downsizing corporation, the politics of indifference to the poor and minorities, the readiness to exploit those lacking the power to protect themselves—these are what come naturally to us. This is why the precepts of Jesus are so terribly challenging, and why the idea of God as a "suffering servant" is still so shocking.

From reciprocal altruism to pure altruism may be a small step in pure logic, but Darwin was right in sensing what an impossible leap it is in the concrete world of biology. Darwinian evolution was both necessary and sufficient to raise us to the jumping-off point for such a leap, by making us the conditionally altruistic creatures that we are; but it can carry us no further. The divine, universal altruism of Christ—even the very idea of it—is something that we, by our own power, can scarcely even approach asymptotically, never perfectly achieving it. As the farmer told the lost traveler in the old joke, it really seems in practice that "You can't get there from here."

Why, after all, would a God who was content to let evolution take its course for billions of years suddenly step in with something as meddlesome as a direct revelation of the divine will? Surely not for lack of patience! If we believe that such explicit revelation has occurred (especially in the person of Jesus), then we can only understand it as necessitated by our own constitutional inability ever to figure out that divine will on our own. "What? Put my own interests on the same level with those of somebody whom I don't need and who can't do anything for me in return? Nah, God would never expect me to do that. What ivory-tower philosopher dreamed that one up? It's not even possible. Show me someone who ever did that!"

The Static (Cyclic) versus the Evolutionary Universe

We have just seen our ethical history starting with a crudely Darwinian "law of the jungle" based on selfishness; progressing to more enlightened forms of self-interest in well-regulated societies (both animal and human); and finally encountering (in the Jewish tradition, culminating with Jesus) an increasingly clear divine call to transcend that same (divinely created!) selfishness which had powered our entire biological and cultural evolution. Perhaps this leaves us feeling a bit disoriented, or at least ambivalent about this whole evolution business. But we should expect the rules to change as we mature from children into adults. Maybe we remember a dramatic moment when that happened. Or maybe we just looked back one day and suddenly realized how far we had come. Our evolution is no different. We have made (or at least have been challenged to make) a radical break with a past grounded in "survival of the fittest," and have been given a new commandment: to love one another.

So here we stand, with at least one foot in the old Darwinian dispensation and the other, hopefully, on the road to the Kingdom of God. St. Paul struggled with the inner conflict this predicament entails for each of us (Romans 7:14-23), and we shall see further on that it is intimately connected with the doctrine of original sin. But first, mustn't this break with the past also have caused a parallel split in our cultural and intellectual history? Might this history shed some light on the ongoing debate and confusion over "creation versus evolution"?

Indeed, this radical shift in our conception of ethics is tied to an equally radical shift in our civilization's whole outlook on existence—from seeing the world as fundamentally unchanging, to viewing it as the product and perpetuator of a process of change on its way to an unimaginable (but hopefully better) future. It was in this context that science as we know it developed, and evolution was discovered. This context was provided by the Judeo-Christian tradition—which is to say, by the Bible. This may come as a surprise to those who see the biblical account of our origins as the very antithesis of evolution, but it goes to show how badly many readers of the Bible have missed the point.

The Biblical Origins of Science

Though "static" compared to our present concept of an evolving cosmos, the ancient worldview that colored the Genesis revelation without being an integral part of it, and which was (and still is) largely prevalent outside the Judeo-Christian-Islamic tradition, was more complex than the word "static" implies. Cyclic events (day and night, summer and winter, birth and death, even dissolution and regeneration of the

universe itself) were endlessly repeated in a cosmos devoid of what we would call "progress." This dynamic, cyclic conception was nonetheless "static" in that no net change, or only degeneration, would occur over the long haul, making history essentially futile. By contrast, the evolutionary universe exhibits real, irreversible change along the axis of time, drawing the natural cycles out, metaphorically, into a spiral that actually goes somewhere.

While the scriptures of the ancient Hebrews borrowed mythic and literary elements from the cyclic worldview of neighboring peoples, they actually represent that worldview's emphatic transcendence. It was precisely the biblical tradition that gave to human thought—and eventually to the scientific and evolutionary worldview—the notion of meaningful change through time and the valorization of history itself, springing from the idea of creation at a specific moment in time (really, the creation of time itself) and other acts of God in history (see the classic treatments of these themes by Eliade 1954 and Jaki 1974). Rather than the world being a dispiriting place in which primeval chaos spawned gods of limited power who acted for arbitrary, conflicting, and often malevolent reasons, the Hebrew scriptures portrayed the world for the first time as the free creation of a single, almighty, rational, and benevolent God. This world was law-governed, dependable, congenial, and offered us a hopeful future—because *God had promised it, and God was in charge*. The optimism and confidence in progress that sprang from this crucial conceptual shift, reflected in the mythical narratives of Genesis 1-3 and hammered home throughout the prophetic books, were the groundwork groundwork for the origins of all of Western science, including the discovery of evolution.

*The Bible laid the
metaphysical foundations
of modern science*

In short, while the ahistorical-cyclic and the historical-evolutionary worldviews are decidedly at odds, the biblical view bridges them. The evolutionary outlook shares with and derives from the biblical view a monumentally important trait: the emphasis on positive net change through time. Like the Bible, it reflects our belief that unique and important events have happened throughout history—whether it be salvation history or evolutionary history. How ironic that the Bible has been so often misread as opposing the very idea of evolution for which it prepared the way!

Progress in evolution. The biblical worldview holds that history is going somewhere, and God has promised that things will turn out right in the end. In other words, there is progress. Many evolutionists today, however, deny there is any "progress" in evolution at all, moral or otherwise. This is an overreaction to the discredited idea that all living things automatically, necessarily become bigger, more complex, more sociable, more intelligent, or in some absolute sense "better" with the passage of time. In fact, organisms simply do what they can to survive, each day, in each day's environment—to preserve the status quo of their own continued existence. If remaining as they are accomplishes that, then they remain much as they are, perhaps for millions of years—bacteria, coelacanths, opossums, or whatever. They may even become smaller or less complex, if natural selection so dictates.

Taking the record as a whole, however, it is fair to say that the average size, complexity, sociality, and intelligence (and other features) of organisms in general have shown a net increase, simply as a statistical result of the fact that the maximum size, complexity, sociality, and intelligence exhibited by any organism have increased. Once there existed only single-celled life forms; now there exists an entire spectrum from single-celled life through all sorts of multicelled plants, fungi, and animals, including us. Most of the single-celled creatures have not tended to become

multicelled, nor have most of the vertebrates tended to become human-like (or turtle-like, or bird-like). But some have, and the whole envelope of diversity, size, complexity, sociality, and intelligence (and other traits) has been stretched as a result.

Being large, complex, social, intelligent creatures ourselves, we naturally like to define increase in these traits as progress. This is our privilege; but we should acknowledge its subjectivity. Bacteria inhabiting the hot springs of Yellowstone might prefer to equate evolutionary progress with the ability to live in near-boiling water, while tapeworms would presumably view their own elegantly simplified anatomy and freeloading lifestyle as the pinnacle of progress.

A more general criterion of progress, however, lies in the fact that selection favors *efficiency* in the use of energy and resources by all living things. Over geological time, this constant competition for more efficient use of resources has led to greater ecological specialization by species, hence greater diversity of species, hence more complex interactions and networks among species. Seen against this background, our own complexity and adaptive efficiency do not appear merely as the quirks of one minor branch of the evolutionary tree, but instead emerge into view as the most marked expression of a truly general trend. No other species survives in as many environments as we do; no other species interacts among its own members and with other species in as many ways as we do; and no other species adapts to change as efficiently as we do, thanks to our strategy of cultural evolution. We are biologically special not primarily because of things we do that no other organism does; we are special because of the things all others try to do (interact, adapt and survive) that we do better, more effectively, and more extravagantly than any of them.

We are therefore on firm ground in saying that evolution intrinsically shows predictable trends, ones that can be objectively defined as "progress": an increase in the energetic efficiency of individual organisms, an increase in the complexity of ecosystems (communities of living things), and a consequent expansion of the universe of realized possibilities.

Further thoughts. We have seen that the selfishness programmed into all living creatures by Darwinian natural selection produced cooperative and even incipiently ethical behavior on the part of "higher" animals, including humans. But there was a limit to how far toward "pure" altruism this Darwinian process could carry us. Truly selfless behavior—the kind that truly reflects the nature of God—was introduced to us literally as divine revelation (most of all in the incarnate example of Jesus). In no other way could we ever have taken the idea seriously as a viable strategy for living. Also revealed to us were other key lessons, including: creation at a beginning by a single, all-powerful, rational God; God's continuing concern and good will for us creatures; and God's promise of a glorious future.

Taken together, these lessons confirmed our forebears in the beliefs that the world was basically good and ruled by a trustworthy God who had a plan to do us good and not evil, and that history is not all bad but records many wonderful things that God has already done for us. That faith encouraged them to seek and discover the laws of nature and to make history on their own, confident that they could change the world for the better as long as they cooperated with God. This optimism then prepared them (however unknowingly) for the discovery of the mechanism and history of evolution.

Yet all was not rosy. Alongside the hope of progress was the fact of evil. Implicit in God's law was the ever-present possibility of sin. To explain these unpleasant realities, the Church developed the notion of "original sin," as we will see in "Original Sin in the Bible as Read Today." In "A New Interpretation of Original Sin" we shall discover what becomes of this explanation, now that Adam and Eve have been replaced by fossils and Darwin.

Evil, Ethics, and Human Values in an Evolving World: Major Points

- Practically all the overt acts regarded as "sinful" in humans are part of the normal, natural repertoire of behavior in other species.
- These acts are instances of the selfish behavior that natural selection necessarily enforces on all living things. Without this kind of behavior—oriented to individual self-perpetuation and self-reproduction—life could not continue, let alone evolve.
- Traits held in common by different species (such as these selfish behavior patterns) are most likely inherited from a common ancestor.
- The first human beings were far too late on the scene to have been the originators of the unpleasant overt behaviors that in our species alone, through our moral choices, took on the character of sins. Since all living things act selfishly, the common ancestor from which we inherit our selfishness must be the common ancestor of all living things.
- This purely biological, amoral selfishness has been positively good (in a natural, not moral, sense), since it was the means God employed (through the evolutionary process) to achieve a good result.
- In calling the entire creation "very good," the Creator was not ascribing to it a moral quality that only moral agents such as ourselves can possess; its goodness is that of the admirable tool and the admirable work.
- God does not need to micromanage evolution. Through its own autonomous processes (which include suffering and death), evolution can predictably produce life and intelligence. God humbly invites our further progress rather than commanding it. The Darwinian "messiness" epitomized in the sufferings of all living creatures, and the Creator's humility epitomized in the sufferings of Jesus, are two sides of the same coin.
- Many attempts to construct systems of "evolutionary ethics" have mistakenly assumed that naked competition is the only rule of evolution. But such competition is merely the most basic, not the most refined, form of behavior through which natural selection can act. For example, the Golden Rule, in the form of reciprocal altruism, is followed by many of our fellow creatures.
- God, in the biblical tradition, has sought to lead us beyond reciprocal altruism to a purer form of altruism. What Jesus meant by the parable of the Good Samaritan was: Even the enemy you despise most is your neighbor, and it is that neighbor's interest that you are to set equal to your own. Furthermore, throughout his teaching, Jesus made clear that this pertained especially to the

despised poor: in short, to those who not only would not, but could not, repay.

- Moral precepts progressed from "Treat others as you would have them treat you" to "Treat others as you treat yourself" to, finally, "Treat others as I (Jesus) treat you."
- From reciprocal altruism to pure altruism may be a small step in pure logic, but Darwin was right in sensing what an impossible leap it is in the concrete world of biology. Darwinian evolution was both necessary and sufficient to raise us to the jumping-off point for such a leap, by making us the conditionally altruistic creatures that we are; but it can carry us no further.
- Progress in our evolution has taken the forms of increases in the energetic efficiency of individual organisms, increases in the complexity of ecosystems, and a consequent expansion of the universe of realized possibilities.
- Whereas archaic worldviews see history as a futile repetition of endless cycles, the biblical tradition introduced the optimistic notion of progress, based on confidence in a good God who acted in ways beneficial to us. This confidence in a rational, law-governed universe was a prerequisite for the development of science and the discovery of evolution.

Evil, Ethics, and Human Values in an Evolving World: Discussion Questions

- Do you find it hard to conceive of life, "design," complexity, or intelligence arising in the universe by purely natural processes, not guided in detail by God? If so, can you put your finger precisely on what bothers you about this?
- If we were intended to behave as Jesus taught us (unselfishly), is it illogical to think that God would have made us selfish through the kind of evolutionary process that Darwin described?
- Do you think Darwinian evolution could ever lead us to perfect altruism in the absence of some supernatural revelation?



Hand Clutching Coins (Symbol of Greed)

Original Sin in the Bible as Read Today

by Joseph F. Wimmer

The doctrine of original sin has been an essential part of the traditional teaching of churches of all denominations in the Christian world. Not only does it seem to explain that great enigma—the tendency toward evil found to a certain extent in every human heart—but great theologians have also proposed it as a major reason for Christ's salvific death on the cross. As Paul wrote in Romans 5:18, "One man's offence brought condemnation on all humanity; and one man's good act has brought justification and life to all humanity." The recent Catholic-Lutheran Dialogue on Justification accepts original sin as a given. The members of the committee state that:

as a consequence of original sin all human beings stand in need of justification even before they commit personal sins. [Sinners] can do nothing to merit justification, which is the free gift of God's grace. Even the beginnings of justification ... repentance, prayer for grace and desire for forgiveness, must be God's work in us (1983 Catholic-Lutheran Dialogue on Justification*).

We can now study this traditional teaching—the whole human race's complicity in sinfulness and the need for God's grace (through Christ) to attain our ultimate purpose in life—in the light of faith illumined by contemporary hermeneutics and scientific discoveries.

Our catechisms normally present original sin as a prideful and disobedient act on the part of our forebears, often quite literally Adam and Eve, as a result of which we still suffer dire consequences today, even before any immoral act on our part. The doctrine seems to unfairly implicate us in others' past actions that we could not have controlled: they sinned and we got punished along with them! It is possible now to present original sin in a more meaningful and comprehensible way, even while illuminating a profound mystery in our personal and communal selves. We began by explaining evolution as the way in which the universe has come to exist and continues to develop. Now we can look at how evolution, as a teaching of science, does not in itself deny that the universe could have been created by God. Indeed, it can help us better understand the origins of our tendency to sin.



Dark Horse Head Nebula

Acceptance of Evolution by Pope John Paul II

Not only do most scientists agree that we live in an evolutionary world, Pope John Paul II himself publicly accepted the teaching of evolution in a talk to the Pontifical Academy of Sciences in 1996.⁷ He noted that:

new knowledge leads to the recognition of the theory of evolution as more than a hypothesis. It is indeed remarkable that this theory has been progressively accepted by researchers following a series of discoveries in various fields of knowledge. The convergence, neither sought nor provoked, of the results of work that was conducted independently is in itself a significant argument in favor of this theory.

Pope John Paul II said that although there are several forms of evolutionary theory (including materialist and reductionist ones) that would exclude the existence of God in principle, there are other ways of understanding evolution that are compatible with Catholic Church teaching. These theories do not deny that humans were created in God's image and likeness (Genesis 1:27-29), with intellect and will that are capable of entering into a relationship with God "that will find its complete fulfillment beyond time, in eternity" (John Paul II 1988, 114). In explaining how the creation of a spiritual soul would not cause a break in the process of evolution, Pope John Paul II notes that "consideration of the method used in the various branches of knowledge makes it possible to reconcile two points of view which would seem irreconcilable" (116). He goes on to explain:

The sciences of observation describe and measure the multiple manifestations of life with increasing precision and correlate them with the time line. The moment of transition to the spiritual is not the object of this kind of observation, which nevertheless can discover at the experimental level a series of very valuable signs indicating what is specific to the human being. But the experience of metaphysical knowledge, of self-awareness and self-reflection, of moral conscience, freedom, or again, of aesthetic and religious experience, falls within the competence of philosophical analysis and reflection, while theology brings out its ultimate meaning according to the Creator's plans (116).



Statue of Pope John Paul II

Evolution as a scientific hypothesis which explains so much about the interrelated nature of the whole universe does not contradict Christian doctrine. One can still argue that evolution is the way in which God creates the world.

Using Literary Forms to Study the Bible

Did Adam and Eve really exist, or is the story of Genesis 2-3 ahistorical? If not historical, is it myth? And if myth, should we simply disregard or discard it? Before we can answer these questions adequately, we must address the issue of biblical hermeneutics, that is, literary methods of interpreting the text in the Bible. Exegetes* begin the study of a biblical passage by asking: "What kind of text is this? Is it a chronicle, a saga, a legend, a myth?" If someone responded by saying that this is the word of God, and since "God cannot tell a lie" it is "literally true," they would be missing the point. The Bible is the word of God as expressed in human words, and the "true" meaning of a passage might well transcend whether or not the events narrated "really happened." Such study of literary genres of texts can include the Bible.

Interpreters of the Bible in the Catholic Church may now make use of the various literary forms identified by Hermann Gunkel and others at the end of the nineteenth century. Pope Pius XII taught this in an encyclical dating from 1943, and it has been repeated several times, both at the Second Vatican Council in 1965, and in the 1993 document from the Pontifical Biblical Commission entitled "The Interpretation of the Bible in the Church." Pope Pius XII said:

What is the literal sense of a passage is not always as obvious in the speeches and writings of the ancient authors of the East, as it is in the works of the writers of our own time.... For the ancient peoples of the East, in order to express their ideas did not always employ those forms or kinds of speech, which we use today; but rather those used by the people of their times and countries. What those exactly were the commentator cannot determine as it were in advance, but only after a careful examination of the ancient literature of the East... (with its) certain fixed ways of expounding and narrating, certain definite idioms, especially of a kind peculiar to the Semitic tongues, so-called approximations, and certain hyperbolical modes of expression, nay, at times, even paradoxical, which help to impress the ideas more deeply on the mind" (Pius XII 1943, 35-37).

Vatican II later reinforced this approach:

Those who search out the intention of the sacred writers must, among other things, have regard for 'literary forms'. For truth is proposed and expressed in a variety of ways, depending on whether a text is history of one kind or another, or whether its form is that of prophecy, poetry, or some other type of speech. The interpreter must investigate what meaning the sacred writer intended to express and actually expressed in particular circumstances as he used *contemporary literary forms* in accordance with the situation of his own time and culture. For the correct understanding of what the sacred author wanted to assert, due attention must be paid to the customary and characteristic styles of perceiving, speaking, and narrating which prevailed at

the time of the sacred writer, and to the customs men normally followed at that period in their everyday dealings with one another (Vatican II 1965, 12).

These texts are important because they allowed Catholic exegetes to join their other Christian colleagues in applying the insights of literary theory to their study of the Bible, especially the first eleven chapters of Genesis, which have a character all their own. As an ahistorical theology of origins, these chapters are not meant to be taken literally. They are mythic narratives that teach profound truths as only such narratives can.

A Note About Myth. In the nineteenth century "myth" meant fable, invention, fiction; today scholars regard mythic stories as "true" and precious because they are sacred, exemplary, and significant. "Myth narrates a sacred history; it relates an event that took place in primordial time, the fabled time of the 'beginnings'" (Eliade 1963, 5). Mythic events can occur in remote times that are either primordial and prehistoric or are in the distant future. These events, while taking place outside of historical time, nevertheless impact historical events. Myth describes the beginning of human and earthly happenings, and points them toward their end. Mythical events are normative and appear as prototypes of all happenings. It may be said of myth that "it never happened but it is always there" (*Sacramentum Mundi* IV, 153).

Theological Assessment of Myth. The tension between eternity and time is expressed in Christian thought through "myth." Myth articulates God in the language of history, eternity in the language of time, and the transcendent in the language of human action. In this sense "myth" is not something unreal, a fairy tale. It is a means of talking about the reality of God, and the "myth" of creation is true, not as a literal event, but as an affirmation about the relation of everything in the world to God as Creator. "The myth of creation does not tell us about a first moment of time, any more than the myth of the Fall tells us about a first human being. What it does tell us is that every moment of time, like every contingent being, comes to be from the creative power of God" (Gilkey 1965, 317).

The Story of Adam and Eve

If humans were created according to the process of evolution, what happens to the central church doctrine of "original sin"? Certain aspects of it can be rethought in the mythic context, and indeed theologians have had much to say about it. First of all, the story of Genesis 2-3 about Adam and Eve is now generally acknowledged to be a mythic narrative used by the biblical author (the Yahwist,* probably during the monarchy of Solomon or one of his successors) to dramatize the mysterious, non-divine origin of sin and its consequences. Further, the text should not be considered only in itself, but also as part of the whole theology of origins, Genesis 1-11, and of course from the viewpoint of its use by Paul in Romans 5:12-21 and elsewhere.

Genesis 1-11. Exegetes usually ascribe the following stories of Genesis 1-11 to the Yahwist: Adam and Eve, Cain and Abel, sexual relations of the "sons of God" with human women, one version of the Flood, the drunkenness of Noah and the sin of his son Ham, and the Tower of Babel. These vignettes have as their primary purpose to manifest the origin and growth of sin, and at the same time to show God's response as one of justice (punishment) and of mercy. After dealing with humanity as a whole in Genesis 1-11, God initiates a new relationship with Abraham that becomes a blessing "for all nations" (Genesis 12).

Genesis 2-3. Within this larger context we can now consider Genesis 2-3, the story of Adam and Eve. It is structured into two basic panels: (1) creation of Adam, placement in the garden, and formation of a suitable partner (Genesis 2), and (2) temptation, sin, judgment, and expulsion from the garden (Genesis 3). The first scene serves as a foil and setup for the second, and gives us little information about the "state of original justice." The focus of attention is the temptation, sin, and threefold punishment of the serpent, Eve, and Adam. It provides etiological* explanations for snake travel without legs, the pains of childbirth, hard labor in the field, and death. It also introduces the general themes of alienation and blaming others.

Scene 1: Life in the Garden (Genesis 2)

God planted a garden in Eden which contained the tree of life and the tree of the knowledge of good and evil. He then placed Adam (which in Hebrew means "humankind") in it to cultivate and care for it. He gave Adam permission to eat from any of the trees except one, and threatened death as a punishment in case of infraction.

The Tree of Life. As long as Adam (humankind) was able to eat from the fruit of the tree of life he would live; he is expelled from the garden of paradise (Eden) with his wife precisely so he will no longer have access to that tree (Genesis 3:22-24). Bruce Vawter (1977, 68, 89) states that humankind was not created immortal: "immortality was not a gift that he forfeited but one that he failed to obtain."

Death in Other Legends. Various extra-biblical cultures also use the image of a plant of life or fountain of youth that would allow one to live forever, a "reality" which was almost in human grasp but finally not obtained. According to the Mesopotamian ***Epic of Gilgamesh***, Tablet XI, Gilgamesh heard about a plant of life at the bottom of the sea. Tying rocks to his feet, he went down there in search of it. He found it, cut the rocks from his feet, came to shore, and said: "This plant is a plant apart, whereby a man may regain his life's breath ... Its name shall be 'Man Becomes Young in Old Age.' I myself shall eat it and thus return to the state of my youth." Then, when he and his companion Urshanabi were camping for the night at a well and Gilgamesh went into the water to bathe, "a serpent snuffed the fragrance of the plant; it came up [from the water] and carried off the plant. Going back it shed [its] slough" (Pritchard 1969, 96). Gilgamesh "lost," that is, failed to obtain, the means of living forever.

The same theme is expressed in the Babylonian ***Legend of Adapa***. The hero Adapa from Eridu came to heaven to look for two gods who had disappeared, Tammuz and Gizzida. He had previously been told by the god who created him, Ea, that if he were offered "bread of death" or "water of death" he should not eat or drink, but if he were offered a garment and oil, he should put on the garment and anoint himself with oil. He arrived in heaven and was offered "bread of life" and "water of life," but he neither ate nor drank. He was also offered a garment and oil, and took them. He then found out that he would have had (eternal) life had he accepted the bread and water. He was cast back to earth (Pritchard 1969, 101-102).

In Egypt, according to an ancient pyramid text, **King Pheops** heard about a tree of life on a distant island and went in search of it. At times pharaohs are depicted standing next to a sacred tree in the company of Egyptian gods who promise the pharaoh "countless years of life" (Gaster 1969, 29-34).

The *Catechism of the Catholic Church*, nos. 374-79, discusses the "state of original justice," acknowledging the "symbolism of biblical language" (no. 375), and states that "as long as he remained in the divine intimacy, man would not have to suffer or die" (no. 376). All of these texts describe why people die even though they would like to live forever.

The Tree of the Knowledge of Good and Evil. Adam (humankind) and the Woman (she is not named until after they are sentenced by God for their sin, Genesis 3:20) were forbidden to eat from the tree of the knowledge of good and evil, but they did so (Genesis 3:6) and were punished by expulsion from access to the tree of life.

Gaster claims as a general background to this tree story the idea that trees in divine groves helped the gods' jealous guarding of their own prerogatives; they don't want ambitious humans to be as wise as they. Of Genesis 3 Gaster says, "consideration of the folklore background enables us to recognize that the true theme of the story is a similar abortive attempt on the part of man to usurp divine status and equality" (Gaster 1969, 35). This is not far off from the usual description of the sin of Adam and Eve as a sin of pride.

Nakedness. The only verse in Genesis 2-3 that describes the "state" of Adam (humankind) and the Woman before what is commonly thought of as the Fall, is Genesis 2:25, which reads "The man and his wife were both naked, yet they felt no shame." This verse, bridging creation and the Fall, is interpreted on the basis of Genesis 3:7, 10:

Genesis 2:25—naked, they felt no shame

Genesis 3:7—they realized that they were naked, so they made loincloths

Genesis 3:10—[Adam to Yahweh] "I was afraid because I was naked, so I hid."

The image of being naked and not self-conscious about it probably derived from the behavior of young children, who would have gone about naked in the Middle East. It is an image of peace, mutual trust, childlike simplicity, and closeness.

The image of nakedness in Genesis 2:25 prepares the reader for the transformation of its meaning that occurs in Genesis 3:7, 10. Does this mean that Genesis 2:25 cannot also be used to tell us about special gifts of Adam and Eve in paradise prior to the Fall? Bruce Vawter (1977, 89) strongly argues against the existence of any such "preternatural gifts."

Scene 2: Temptation, Sin, Judgment, and Punishment (Genesis 3)

The serpent is one "of all the animals that the Lord God had made" (Genesis 3:1). It is therefore not itself the devil, but simply a creature the ancients recognized as dangerous and cunning (Numbers 21; Proverbs 30:19). The temptation by the serpent is artfully expressed. Was the Woman forced to sin? No, she had that capacity even before the temptation. Vawter explains:

It is not true, as we see, that man and woman in their primordial state were conceived as in such a condition of innocence that they were incapable of contemplating transgressions even on their own. The tempter has made the

suggestion, but the woman has made the decision based on her own judgment—'this thing is good to have.' In other words, while the story depicts a 'fall' of man in the sense that he commits a sin, misses the mark, transgresses a commandment imposed upon him—and, since the perspective is of the first man and woman, it can be viewed as the first sin and first transgression—still, it is not a fall in the sense that man after has become anything else than man was before. The potential for transgression is always present (Vawter 1977, 78f).

The result of this first transgression is alienation from one another (they are ashamed of their nakedness) and from God (they hide).

Yahweh did not abandon Adam (humankind). Adam even walked with God in the cool of the garden. But Adam (humankind) and the Woman hid before God even called their names. The consequences of their sin were automatic. The progression of events occurred as follows:

Genesis 2:17— Prohibition from eating of the tree of the knowledge of good and evil. The Jerusalem Bible's note on Genesis 2:17 says:

This knowledge is a privilege which God reserves to himself and which man, by sinning, is to lay hands on, 3:5, 22... It is the power of deciding for himself what is good and what is evil and of acting accordingly, a claim to complete moral independence by which man refuses to acknowledge his status as a created being. The first sin was an attack on God's sovereignty, a sin of pride. This rebellion is described in concrete terms as the transgression of an express command of God for which the text uses the image of a forbidden fruit.

Genesis 3:11-13—Ungallant excuses!

Genesis 3:14—The snake is cursed: etiological explanation as to why snakes crawl on their bellies and eat dust (see also Micah 7:17; Isaiah 65:25).

Genesis 3:15—Proto-evangelium*? This text has often been interpreted by the church as referring to Christ or to Mary as the one who would crush the serpent's head. Some modern translators and commentators emphasize the continuing struggle between humans and serpents (even as symbols of evil), but do not see any advantage to the human in that the bite of a venomous snake would be deadly also in the heel. Others, however, see a sign of optimism in the naming of the Woman as "Eve," the "mother of all the living" (Genesis 2:20), and, of course, also in the implied reference to Christ or Mary, both of whom were victorious over the forces of evil symbolized by the serpent.

Genesis 3:16—Punishment to the Woman was life as it was known in the time of the Yahwist: childbearing in great pain and attraction to a man who would then lord over her. The mythical elements of a primordial time and place that were set in Genesis 2-3 prepared us to explain the way things are now.

Genesis 3:17-19—Punishment to Adam (humankind): the ground is cursed and Adam must earn his keep by the sweat of his brow.

Genesis 3:20—"You are dust and unto dust you shall return"

By the mere fact that humanity is organic, made of "dust," it will die. Yet the point to be explained is not only the reality of death, but also its poignant, tragic character, the horrendous pain and terror connected with it. This second aspect of death is explained in the punishment for sin. At this point

Adam names the Woman "Eve." His right to name her shows that she is under his authority, but since this authority is established after the divine sentence for sin, it is done so in the context of a sinful world.

Genesis 3:21—"God made leather garments with which he clothed them"

Divine graciousness: God does not abandon his people, even after they have sinned; he punishes, severely, but then continues communion of life.

Genesis 3:22—"the man has become like one of us, with his knowledge of good and evil" If we read Genesis 2:17 (prohibition from eating of the tree of the knowledge of good and evil) in the light of Genesis 3:5 (the tree as tempting: "good to eat, pleasing to the eye, and enticing for the wisdom that it could give") and Genesis 3:22 ("the man has become like one of us, with his knowledge of good and evil"), the argument that the sin of Adam and Eve is the sin of pride—of wanting to be independent like God, able to determine what is good and what is evil—comes full circle.

Genesis 3:23-24—They were expelled from access to the tree of life, lest they become immortal.

Original Sin in the Old Testament

Old Testament meaning of Genesis 2-3. Norbert Lohfink points out that the basic relationship of the Israelites with God at the time of the Yahwist was one of covenant, and that the sin involved here was a breach of the covenant. He states that this "represents a reflection upon the entry of evil into the world at the beginning of history, on the basis of a religious experience which was first given and thought out within Israel's covenant with God. It is only through the idea of the covenant that all the dark side of human existence came to be regarded as a consequence of sin, and sin as an act of human freedom" (Lohfink 1968, 60).

Allusions to Genesis 2-3 in the Old Testament. Surprisingly, there are extremely few allusions to the story of Adam and Eve in the rest of the Old Testament. There is only one indirect one in the Hebrew Bible, the portrayal of the proud king of Tyre as an Adam-like figure on a mountain, headed for a fall (Ezekiel 28). In the Septuagint* there are two more allusions, the statement in Sirach 25:24 that "Sin began with a woman, and thanks to her we all must die," and in the Book of Wisdom 2:24 that "Death came into the world only through the devil's envy, as those who belong to him find to their cost." Both are very late texts, written about 180 BC and 50 BC respectively. It seems clear from this paucity of references to the story of Adam and Eve that the Old Testament and the community in which it was written do not teach "original sin."

Inclination to evil or yetzer hara'. Judaism does not have the concept of original sin. Instead, it has the concept of "inclination to evil" (*yetzer hara'**). The Yahwist attributed the Flood to this "inclination to evil," because "every plan devised by his mind (*kol yetzer macheshebot libbo*) was nothing but evil (*ra'*) all the time" (Genesis 6:5). At the same time, the Yahwist also attributed to this "inclination to evil" the fact that God would not repeat the Flood, for "the devisings of man's mind (*yetzer leb ha'adam*) are evil (*ra'*) from his youth" (Genesis 8:21).

Universality of sin. Thus Judaism did not use the story of Genesis 2-3 as its explanation for human proclivity to sin. Nevertheless within the Old Testament there are several aspects of sin which reappear in the later traditional understanding of "original sin," especially the universality of sin, the idea that "everyone is a sinner":

1 Kings 8:46—"there is no one who does not sin"

Proverbs 20:9—"who can say, 'I have cleansed my heart, I am purified of my sin'?"

Qoheleth⁸ 7:20—"No one on earth is sufficiently upright to do good without ever sinning"

Qoheleth 9:3—"The human heart is full of wickedness.... Folly lurks in our hearts until we end among the dead."

Psalms 51:5—"I was born guilty; a sinner from the moment of my conception"

Corporate sin. The Old Testament also understands bonds between humans that unite them in sinfulness and guilt. Members of families and "generations" are often punished even though individually they had not committed any sins:

Genesis 20:9—[Abimelech to Abraham] "What wrong have I done to you, for you to bring such guilt on me and on my kingdom?" Abraham had said that Sarah was his sister and allowed her to be brought to Abimelech, who was warned by God not to touch her.

Exodus 34:7—"punishing the parent's fault in the children and in the grandchildren to the third and fourth generation"

Numbers 16: 31-32—"The moment [Moses] finished saying all this, the ground split apart under their feet, the earth opened its mouth and swallowed them, their families, all Korah's people and all their property." This refers to the rebellion of Dathan, Abiram, and Korah, and their punishment, along with their families.

Joshua 7:25—"Joshua then took Achan son of Zerah and led him up to the Vale of Achor, with the silver and the robe and the ingot of gold, his sons, his daughters, his oxen.... And all Israel stoned him to death and they burned them and threw stones at them." This refers to the sin of Achan, and the punishment of him and his family.

Micah 3:8—"to accuse Jacob of his crime and Israel of his sin"

Original Sin in the New Testament—The Pauline Literature

There are a number of New Testament texts which pertain to a discussion about original sin, but all of them are in the context of salvation by Christ:

Hebrews 9:24-28—"Christ ... made his appearance once and for all, at the end of the last age, to do away with sin by sacrificing himself."

2 Corinthians 5:21—"For our sake [God] made him to be sin who knew no sin, so that in him we might become the righteousness of God"

John 1:29—"Look, there is the lamb of God which takes away the sin of the world"

St. Paul focused on the universality of sin and the need for all to be saved by the grace of Christ appropriated through faith and baptism: "All have sinned" (Romans 3:23) and "all, both Jews and Greeks, are under the power of sin" (Romans 3:9). They can be justified only by God's "grace, as a gift, through the redemption that is in Christ Jesus, whom God put forward as a sacrifice of atonement, by his blood, effective through faith" (Romans 3:24-25).

In Paul the universal dimension of human sin is especially exemplified in the figure of Adam: "As all die in Adam, so all will be made alive in Christ" (1 Corinthians 15:22),

and "Sin came into the world" through Adam and "death came through sin, and so death spread to all because all have sinned" (Romans 5:12-21). The full meaning of the final clause, "because all have sinned," is unclear. It implies personal guilt for committing sin, but in light of statements that Adam's sin "led to condemnation for all" (Romans 5:18) and that by his disobedience "the many were made sinners" (Romans 5:19), the connection between Adam's sin and that of all others must be very intimate.

Does the New Testament teach the historical existence of Adam? Does the contrast between Adam's sin and Christ's redemption in the Pauline literature (Romans 5:12-21; 1 Corinthians 15:21-23; and elsewhere) imply that the New Testament teaches the real historical existence of Adam as recounted in Genesis? No, it does not. Stanislaus Lyonnet, SJ⁹, for example, states:

Adam's culpability, the universality of sin, and the solidarity of all men are to [Paul] facts commonly known and proven from Scripture. They are not ends, but rather presuppositions and means for his proof. He uses them in order to illumine and clarify the universality of the saving work of Christ.... [T]he literal understanding of the account of the Fall does not belong to the object of Pauline teaching.... (quoted by Connor 1968, 220-221).

Yet even if Adam is taken as a symbol for all humanity, there is an underlying understanding of the unity of all people and a certain interaction and complicity in sin. Romans 5:12-21 is the classical illustration of this: "Sin entered the world through one man, and through sin death, and thus death has spread through the whole human race because (Greek: *eph ho*) everyone has sinned."

In his commentary on *Romans*, Fr. Joseph Fitzmyer, SJ (1993) gives an exhaustive list of the various translations of the difficult Greek expression *eph ho* in Romans 5:12.

The *eph ho* of Romans 5:12 means:

1. "with the result that" (Fitzmyer)
2. "since," "because," "inasmuch as" (Achteemeier, Barrett, Bonsirven, Bruce, Bultmann, Dibelius, Dodd, Dunne, Käsemann, Kuss, Lagrange, Pesch, Prat, Schlier, Wilckens)
3. "in whom" (Augustine, Thomas Aquinas, Bonaventure) (Doubleday Anchor Bible, 1993).

Fitzmyer translates Romans 5:12 as follows: "Therefore sin came into the world through one man and death through sin, and so death spread to all human beings with the result that all human beings sinned." He then comments:

[In Romans 5:12] Paul is ascribing death to two causes, not unrelated: to Adam and to all human sinners. The fate of humanity rests ultimately on what Adam, its head, had done to it. The primary causality for its sinful and mortal condition is ascribed to Adam.... The universal causality of Adam's sin is presupposed in 5:15a ["If death came to many through the offence of one man..."], 16a ["One single offence brought condemnation..."], 17a ["It was by one man's offence that death came to reign over all..."], 18a ["One man's offence brought condemnation on all humanity"], 19a ["Just as by one man's

disobedience many were made sinners..."]. It would then be false ... to interpret 5:12 as though it implied that the human condition before Christ's coming were due solely to individual personal sins (416f).

Fitzmyer concludes by stating that "the formal effect of Christ's obedience has been to make humanity upright in the sight of God at the judgment seat" (421). Here again the perspective on the sin of "Adam" ratified by all humanity is from that of salvation in Christ.

Whichever translation of "eph ho" is correct, the main point for us to understand is that the figure of Adam is symbolic and not real. If "eph ho" is translated as "because," then the part of individuals in the totality of human sins is highlighted; if "eph ho" is translated as "with the result that" (or even, "in whom"), then the sinfulness of humanity as a whole is highlighted. If "Adam" is taken as a symbol of all humanity, which is generally acknowledged to be the case, then the text need not mean that the sins of the first human being have been handed on in some way to other human beings.

Romans 7. In this chapter Paul makes such statements as "I do not do the good I want, but I do the evil I do not want. Now if I do what I do not want, it is no longer I who do it, but sin that dwells in me" (Romans 7:16-17). Who is the "I" of this chapter? Is Paul speaking of himself before or after his conversion, or of all humanity? Fitzmyer lists five opinions as to the identity of the "I" (*Ego* in Greek): (1) Paul before his conversion, (2) any youthful Jewish boy, (3) Adam, (4) Paul as a Christian, and (5) all humanity. Fitzmyer accepts none of them, but says that "the confrontation of the Ego with sin and the law is ... considered ... from a historical and corporate point of view. Paul views humanity as it was known to him through Jewish and Christian eyes, without Christ and in Christ" (465).

In rejecting the psychological explanation of the "I" in Romans 7 as talking about Paul himself after his conversion to Christianity, Fitzmyer points out all the references to the Mosaic law and adds: "Such an interpretation tends to make of Paul a young Luther" (464). Nevertheless, the issue of the experience of concupiscence, so emphasized by Augustine and Martin Luther, partly on the basis of Romans 7, is an essential part of the teaching on original sin. All Christians acknowledge the presence of concupiscence* even after faith and baptism, but they view it in different ways. We will address this later.

Greek Fathers on Grace and Original Sin

It is commonly said that in their writings the Greek Fathers* emphasized the divinizing effect of grace and the Spirit, but not so much the existence of original sin. This is basically true. The patristic writers were much more optimistic about human nature than others in the West.

Origen. Origen, for example, along with a number of Greek writers, saw the process of grace at work in the "divinization" of God's created people. In his exegesis of Psalm 82:6 ("I say you are gods, sons of the Most High, all of you"), Origen cites Psalm 116:11 ("every human being is a liar"). He says that in and of ourselves we are indeed liars, but we can become gods if we stand on Christ, the Rock. "Thus salvation is attainment of the gift of divinity. Identification with Christ elevates a believer through the humanity of Christ to union with his divinity, thus to deification"

(*On John*, 29, 27, 29; *On Prayer* 27, 13; quoted by Duffy 1993, 55).

Athanasius. "The Son of God became the son of man so that humans, the children of Adam, might become children of God ... sharers in the life of God.... He is Son of God by nature, we by grace" (*On the Incarnation and Against the Arians*, 8; quoted by Duffy 1993, 64).

On the other hand, Greek patristic writers do admit that there are negative effects on later humanity due to the sin of Adam. Because of what happened in paradise, death, sickness, ignorance, and even weakness of will are now the lot of all. And some of them made statements which point in the direction of a doctrine much like that of original sin, though not in the detailed manner of St. Augustine:

Melito of Sardis. "Upon every soul sin sets its mark and all alike she devoted to death. These must die. So all flesh fell into the power of sin, everybody into the power of death" (170-199 AD, *Apology*, 54-55; quoted by Quasten 1962, *Patrology* I, 245¹⁰).

Origen. "The Church has received from the apostles the custom of administering baptism even to infants. For those who have been entrusted with the secrets of the divine mysteries knew very well that all are tainted with the stains of sin, which must be washed off by water and the spirit" (185-253 AD, Alexandria and later, Caesarea; In Rom. com. 5,9; quoted by Quasten 1962, II, 83).

Didymus the Blind. "The fall of the first parents is the sin of old from which Jesus cleansed us in His Baptism in the Jordan" (*De Trin.* 2, 12). "All the children of Adam have inherited it by transmission through the intercourse of their parents. This is why Jesus, born of a Virgin, has not been stained with it" (*Contra Man.* 8) (313-398 AD, Alexandria; quoted by Quasten 1962, III, 97).

Gregory of Nyssa. In the second part of his *Catechesis*, beginning with creation and the sin of Adam and Eve, Gregory shows the restoration of the primitive order by the Incarnation and Redemption (335-394 AD, younger brother of St. Basil, bishop of Nyssa, near Caesarea in Cappadocia, Asia Minor; quoted by Quasten 1962, III, 262).

J. N. D. Kelly (1978), the noted patristic scholar, summarizes the points of these writers' teachings as follows:

- a. they take it for granted that all people were involved in Adam's rebellious act.... e.g. ... St. Gregory of Nyssa ... adds that men ought to ask for forgiveness daily since they share in Adam's fall (350).
- b. they hold that the fall clearly affected our moral nature.... Gregory of Nazianzus traces his own congenital weakness of will to it, and Gregory of Nyssa states that 'human nature is weak in regard to doing good, having been once for all hamstrung through weakness (350-51).
- c. passages ... suggest that certain fathers envisaged also the transmission of sin itself. Basil actually uses the phrase, bidding the rich give food to the poor so as to wipe out the sin which Adam transmitted when he ate the forbidden fruit. Chrysostom seems to have spoken of an "ancestral obligation" written out by Adam amounting to "the first portion of a debt which we have increased by our subsequent sins." But Gregory of Nyssa is much more

outspoken.... sin is 'congenital to our nature,'...: Evil was mixed with our nature from the beginning.... Such thoughts are more frequent in Pseudo-Didymus, who speaks of the ancient "sin" of Adam in virtue of which all men are held under sin (351).

"Though falling short of Augustinianism, there was here the outline of a real theory of original sin" (Kelly 1978, 351). And Duffy (1993) states that the basic concern of the Greek Fathers "was simply to maintain that God alone was the ultimate source of salvation" (64). We will argue that this is an essential insight also of the doctrine of original sin, that humans cannot save themselves but need God's grace to attain their final goal.

Saint Augustine on Original Sin

Like the Greek fathers, Augustine has statements about "divinization" of the human through grace. At one point he uses the simile of adoption:

This spiritual birth is also called adoption. For we were something before becoming children of God, and we have received the benefit of becoming what we were not.... By this generation of grace that Son is distinguished from us, who although he was the Son of God, came down that he might become the son of man and bestow on us the gift of becoming children of God. He came down that we might rise up; and remaining in his own nature, he was made a sharer in our nature, so that we, while remaining in our nature, should be made sharers in his nature (78).

But along with this emphasis on the elevating nature of grace, Augustine also focused on its power of healing the wounds caused by original sin. While the *term* "original sin" is not found in the Bible (Augustine coined it in the Latin *peccatum originale*) its *roots* are patristic and biblical. Infants are "reborn" in baptism (Irenaeus), cleansed from the "true stains of sin" in them (Origen), the "contagion of the ancient death" (Cyprian).

In his writings against the Pelagians,* Augustine accused them of teaching that humans can work out their own salvation, without the help of grace. The Pelagians said that humans are free to sin or not to sin. If they do sin, they imitate the evil actions of Adam, but there is no deleterious influence on them from without that would urge them to sin or not to sin.

Augustine was appalled by this teaching and fought mightily to contain it. In his works, he cited the Christian practice of the baptism of infants as proof that they were being sacramentally cleansed of "sin" and purified by grace. He quoted Romans 5:12 in its Latin form, which stated that sin came into the world with Adam, "in whom" (Latin: *in quo*) all have sinned. How did they sin? Adam committed the originating original sin (*peccatum originale originans*), and all others are under the guilt of that same sin, originated original sin (*peccatum originale originatum*) through propagation.

The result of original sin is concupiscence. Humans are a "massa damnata" (condemned mass) and deserve to be cast into hell. Were it not for the saving grace of Christ, communicated through faith and baptism, they would be. Under Augustine's influence, the Pelagians were condemned by the Council of Orange* in

529 AD.

Concupiscence. While I will return to this concept more fully, Augustine's view of concupiscence is relevant here. According to Duffy (1993), Augustine defined concupiscence as "the abiding inclination to turn from God and to engage in the self-divinizing egoism of total self-satisfaction through the evanescent realities of the world" (92). Augustine associated concupiscence with sexual desire, but did not completely identify the two. Baptism removes original sin, but concupiscence remains, though "it is no longer imputed as sin and will gradually be vanquished by progress in sanctity" (92, citing *Against Julian*, 6, 49f).

Augustine is known as the Doctor of Grace. He emphasized that we need the grace of God at all levels of our conversion in order to be saved. Grace elevates us, "divinizes" us to become children of God, and heals and frees us by taking away original sin, but concupiscence, as an effect of original sin, remains.



Saint in Prayer

The Council of Trent

In 1546 the Council of Trent, set up by the Catholic Church in response to the Reformers, published five "canons" pertaining to original sin (see Connor 1968; also Clarkson et al. 1955, 159). Of special importance is the third canon:

If anyone says that this sin of Adam, which is one by origin and is communicated to all by propagation and not by imitation (*propagatione, non imitatione*), and is in all and proper to each, (if anyone says) that it can be taken away through the powers of human nature or by some other remedy than through the merit of the one mediator, our Lord Jesus Christ, ... or denies that this merit of Jesus Christ is applied through the sacrament of baptism both to adults as well as to infants ... let him be anathema.

Critique of the canons. A hermeneutical* approach will help to determine what, within the cultural context of its authors, the Council of Trent meant and did not mean to say (Connor 1968, 222-225). It included much material from the Council of Orange in 529 AD. The primary intent of the Council of Orange had been to insist on the *necessity of the grace of Christ for salvation*. It introduced original sin to stress

this need, but it said little about Adam, and made no special effort to define original sin or discuss how it is transmitted. The Council of Trent, though, did attempt to describe the transmission of "original sin," in its famous third canon, as taking place "by propagation, not by imitation." But this still allows theologians to speculate on the possible significance of that expression, especially in the light of evolution and the awareness that the narrative of Adam and Eve in Genesis is not historical. However one views the transmission of "original sin," one must acknowledge the fundamental assertion of the councils of Orange and Trent: **humans cannot achieve their own salvation.**

This is indeed the teaching of both Catholics and Reformers, as witnessed, for example, in the 1983 statement on original sin by the members of the Catholic-Lutheran Dialogue on Justification:

... as a consequence of original sin all human beings stand in need of justification even before they commit personal sins. Sinners can do nothing to merit justification, which is the free gift of God's grace. Even the beginnings of justification ... repentance, prayer for grace and desire for forgiveness, must be God's work in us.



Stained Glass, Chartres Cathedral

Some Contemporary Approaches to Original Sin

The issue. We grant that humans need the grace of God—through Christ—to attain their eternal salvation with God in the communion of saints. Since being created does not automatically qualify us for eternal life, we need God's grace to elevate us. God, as "uncreated grace," teaches and loves us. That divine knowledge and love, in turn, is a "created grace" that heals and transforms us. And yet, concupiscence remains as a tendency toward sinfulness on our part that we have "inherited" in some way.

The real issue before us is not whether or not we need grace to be saved (we do), but why we still have such a strong tendency toward sin? While theologians' traditional explanations depended on there having been a real historical Adam and Eve, newer approaches, based on evolution, deny their historical reality while still having a doctrine of original sin and its effect, concupiscence.

Pierre Teilhard de Chardin, SJ

Teilhard wrote several sets of notes about original sin, but did not publish them during his lifetime. They were written in the 1920s and 1940s, but translated by René Hague and published in 1971 (sixteen years after Teilhard's death) under the title *Christianity and Evolution* (Teilhard 1971). Briefly, Teilhard made the following points:

- There is no indication in archaeology or anywhere else in the sciences of a historical Adam and Eve living in an earthly paradise as described in Genesis 2-3.
- The sin of Adam and Eve is used to explain the origin of death, but evolution has a far better explanation, namely the dissolution of complex reality, which is composed of parts that will separate, living cells that will someday die.
- *Original sin has far more meaning if it is considered as the sum total of false starts and failures of the evolutionary process, especially at the human level. It is the negative side of evolution.* In his words:

Original sin is the reverse side of all creation. By the very fact that he creates, God commits himself to a fight against evil and in consequence to, in one way or another, effecting a redemption. The specifically human Fall is no more than the (broadly speaking, collective and eternal) actualizing of this 'fomes peccati' [stimulus to sin] which was infused, long before us, into the whole of the universe, from the lowest zones of matter to the angelic spheres [i.e., Darwinian selfishness]. Strictly speaking, there is no first Adam. The name disguises a universal and unbreakable law of reversion or perversion—the price that has to be paid for progress (40-41).

Elsewhere he says:

... [O]riginal sin expresses, translates, personifies, in an instantaneous and localized act, the perennial and universal law of imperfection which operates in mankind *in virtue* of its being '*in fieri*' ["in the process of becoming"]. ... The drama of Eden would be the very drama of the whole of human history concentrated in a symbol profoundly expressive of reality (51-52).

Teilhard's arguments imply that the universality of sin results from statistical necessity.¹¹ Interestingly, Matthew 18:7 agrees that "it is necessary that scandals come to be." They are taken away by Christ, the Omega Point.¹² As Teilhard passionately asks:

How, then, can we ... make ... original sin and ... the figure of Christ cover the enormous and daily expanding panorama of the universe? How are we to maintain the possibility of a *fault as cosmic* as the Redemption?

The only way in which we can do so is by spreading the Fall throughout the whole of universal history, or at least by locating it *before a complete*

refashioning, a recasting, of which the present order of things, in its experiential totality, would be the result (54).

And salvation? He says,

It is true that in this explanation original sin ceases to be an isolated act and becomes a *state* (affecting the human mass as a whole, as a result of an endless stream of transgressions punctuating mankind in the course of time). Yet even this, far from weakening the dogmatic characteristics of the Fall, intensifies them. In the first place, redemption is indeed universal, since it corrects a state of affairs (the universal presence of disorder) which is tied up with the most basic structure of the universe in process of creation (196-197).

Augustine Hulsbosch, OSA¹³

According to Hulsbosch (1965), evolutionary creation is still going on. The focus of original sin is not on Adam but rather on the fully glorified Christ of the future, the Omega Point of evolution. Humanity must gradually grow into the fullness of Christ to achieve its purpose.

Hulsbosch considers evolution a supernatural phenomenon. As with others, he wants to avoid a natural-supernatural dichotomy in the human. He feels that from the very first moment of creation a person is directed toward God, but that he/she can attain God only through the grace of Christ. That grace—a free gift—is also the final phase of God's creative action. Looking at sin from the end, we can see it as evolving from the incompleteness of humanity: "the refusal of man to subject himself to God's creative will;" "we now impute sin to man's wishing to stay where he is, seeking his happiness on earth, and refusing the continuing creative action of God." Hulsbosch defines original sin as "the powerlessness, arising from nature, of man in his uncompletedness as creature to reach his freedom and to realize the desire to see God, insofar as this impotence is put into the context of a sinful world" (47).

Karl Rahner, SJ

Rahner (1967, 1982; see also Duffy 1993) explains that to be human is to grow in freedom, but in a situation which arose prior to the individual. A person actualizes him- or herself as a free subject in a situation that is always determined by history and by other people. This situation enters into the intrinsic constitution of the act of freedom whereby we determine ourselves. Our experience tells us that there are objectifications of personal guilt in the world that threaten the free decisions of others, and which, as part of the situations in which the others' free decisions are made, become intrinsic elements of the free acts themselves. An example of this is the institution of slavery in the United States.

Christianity teaches that the role others' guilt plays in the situations of every person is universal, permanent, and therefore also original. There are no islands for the individual person that do not already bear the stamp of the guilt of others, directly or indirectly. Original sin may be defined as the universal and permanent guilt that permeates all situations in which free will takes place. Of course, a sinful situation that derives from the decision of another is only analogously—and not univocally—sinful.

In spite of the fact that sin and guilt have been universal and permanent since the beginning of the human race, God's offer of himself remains valid because of, and in view of, Christ.

Piet Schoonenberg, SJ

According to Schoonenberg (1965b, 1967), the Fall is constituted not by a catastrophic sin of the first man, but rather by the innumerable personal sins of all mankind throughout history, taken as a collectivity (Connor 1968, 229); it is the "sin of the world." This sin reaches the individual existentially, through his being situated in the world. "To be" is "to-be-in-a-situation," and thus intrinsically affected by that situation. Schoonenberg gives the example of psychological damage to a child long before it has a chance to defend itself or make a free decision. Such damage affects it long before it would be free to "imitate," and could be said, by extension, to have affected it "by propagation." On the universality of sin, Schoonenberg says that every sin becomes part of the existential situation of those born after it. Because sin has entered the world, every person will meet it in some form or other (124-91).

Paul Ricoeur

Ricoeur (1967) traces the earliest history of three interrelated concepts: defilement, sin, and guilt. The most fundamental of these is defilement, the sense of being dirty or filthy within. He believes this results from the basic feeling of extreme fear or dread that we finite, mortal beings have in the face of our diminishment through death. Various rituals are then established in order to 'cleanse' us from defilement, rationalized as deriving from an objective situation of "sin" caused by breaking certain taboos, such as the emission of semen, the shedding of blood, or even profuse bleeding as in the case of menstruation. Such "sin" makes one objectively guilty, and therefore in need of purification. This understanding of sin also includes murder and other immoral acts, but this ethical dimension is subsumed under the more primitive one of objective evil and its correlative, guilt. A careful study of the relevant texts in Leviticus 12-15 seems to bear this out. These profound human realities are expressed in symbolic myths that give rise to thought. Adam and Eve is such a fundamental myth.

Ricoeur believes that myth clarifies that however profound our sense of defilement, sin, and guilt might be, we are nevertheless fundamentally good! In his words:

We are still not in a position to understand this ultimate intention of the symbol of defilement; it cannot be brought to light except by means of the second-order symbols, especially the myth of the fall. Then we shall understand that myth is not symmetrical with the good, wickedness is not something that replaces the goodness of a man; it is the staining, the darkening, the disfiguring of an innocence, a light, and a beauty that remain. However *radical* evil may be, it cannot be as *primordial* as goodness (156).

Paul Tillich

Tillich states unequivocally that there never were an Adam and Eve or a garden of Eden. The whole story of Genesis 2-3 is symbolic: "Theology must clearly and unambiguously represent 'the Fall' as a symbol for the human situation universally, not just the story of an event that happened 'once upon a time'" (Nessan 1995,

105).

Tillich accepts evolution, although he insists that human nature is qualitatively different from, and at some point in time replaced, animal nature. Animals are selfish, but that is not a fault among them because it is necessary for their survival. Humans, however, in their self-reflection, are aware that all humans share the same right to survival. Selfishness becomes problematic and creates a sense of guilt if it is at the expense of someone else. To further explain the reason for guilt, Tillich introduced the notion of "dreaming innocence," which is not a historical state, but rather "a state of being which potentially belongs to humankind ... as a state of pristine perfection ... a hypothetical category to account for the sense of anxiety and alienation human beings existentially experience" (Nessan 1995, 112). He calls this state "essence," and claims that original sin is the movement from "essence" to "existence," from hypothetical innocence to existential selfishness and guilt. We are called to become the image of God but have not yet attained it. Craig Nessan further explains:

From a Christian perspective, Jesus Christ has revealed the contours of what it would mean for us to fully attain to the image of God. Jesus lived for God and for others with a self-less love that culminated in his death on the cross. Those who live 'in Christ' press onward toward the future goal of a life transformed into the Christ-like image of God. To become like Christ would be the equivalent of becoming fully human (116).

Herbert Haag

Haag (1969) suggests that the church's doctrine of original sin fills in gaps the scripture left in its own depiction of sin:

... [S]cripture teaches the origin and propagation of sin only so explicitly as to say that after the creation of mankind sin entered the world and spread quickly; the idea of inheriting sin is not a biblical concept. Sin exercises on earth a tyrannical power that only a stronger power can conquer. This stronger power is the salvation of Jesus Christ. Mankind under the power of sin (amartia: Rom. 5:12f., 20f.) is mankind outside of Christ; mankind under the power of grace (charis: Rom. 5:15, 17, 20f.) is mankind in Christ. It can thus be said that the Catholic doctrine of original sin is nothing other than an attempt to describe theologically the situation of mankind outside of Christ (73-74).

A number of sociobiologists believe they can explain the sense of guilt expressed in the myth of Genesis 2-3 by contrasting the tendency of one's biological make-up with the needs of society. Tensions arising between biological and cultural evolution are the sources of "original sin" according to Donald T. Campbell, Ralph Wendell Burhoe Philip Hefner, Patricia A. Williams, and many others. The roots of human behavior are found in pre-human activity, which is primarily survival of oneself and of one's genes. There is much competition in an atmosphere of the survival of the fittest, but also cooperation, especially of animals living in society, to preserve genes at least within the group. Yet when humans evolve to a level of self-consciousness, they are faced not only with their own needs but also with that of others, and the two are often at odds with one another. If one's biological tendency is to fight, flee, or cooperate in a limited way, culture developed from the new consciousness might

demand that one might even need to sacrifice oneself for others who are not members of the family or tribe.

Similarly Marjorie Hewitt Suchocki sees original sin in the tendency towards violence which characterizes humans due to their previous evolution. They are called, however, to create a community of well-being, which can be accomplished only through interdependence and the divine power of forgiveness. They need the grace of Christ so that through empathy, memory, and imagination they may bring evolution to the next step, well-being characterized by God's truth, love, and beauty.

Robert Wright

Wright (1994a) points out that according to evolution, men tend to "sow their seeds" far and wide, while women look for strong and healthy mates who would be faithful to them. By way of explanation, Wright quotes evolutionary psychologist George Williams, author of *Adaptation and Natural Selection* (1966), that "natural selection does not work toward overall social welfare; ... much of human nature boils down to ruthless genetic self-interest; ... people are naturally oblivious to their ruthlessness" (52). Williams believes that the moral life consists largely of battling human nature. Wright concludes:

... Yes, we are moral. We have at least the technical capacity to lead an examined life: self-awareness, memory, foresight, and judgment. Still, chronically subjecting ourselves to moral scrutiny and adjusting our behavior accordingly is hardly a reflex. We are potentially moral animals—which is more than any other animal can say—but we are not naturally moral animals. The first step to being moral is to realize how thoroughly we aren't (52).

In light of such a judgment, the Christian call to conform to the image of Christ makes a lot of sense. Christianity makes us aware that the ultimate goal of our human existence far exceeds the fulfillment of genetic impulses.

Are Nature and Grace Two Independent Hierarchies?

We observed earlier that humans were created in a state of "nature," and that they had to be "elevated" by the "grace of God" into a "state of grace" in order to attain their final goal, namely, union with God through mutual knowledge and love. The classical expression of this opposition between grace and nature was given by St. Thomas Aquinas: "Just as the first perfection of human nature, its rational soul, exceeds the power of corporeal nature, so too the ultimate perfection to which the human person can attain exceeds the power of human nature in its entirety" (Duffy 1993, 153).

Although there are two "orders," that of nature and that of grace, there is nevertheless a very positive correlation between them. Through grace nature attains its own deepest fulfillment. Grace not only divinizes, it also humanizes. Thus, nature and grace are not two hermetically-sealed-off realities. If we say that "grace builds on nature," we mean that grace fulfills nature. It should also be said that, in simplest terms, "grace" can be understood from a double viewpoint, the divine and human. As divine, "grace" is another word for God's *influence* on humans, elevating and transforming them into intimate friends of God. From the human point of view,

"grace" is the *transformation of the self* that brings about that intimate union with God.

In the sixteenth century, the Council of Trent clarified the church's ideas on grace in a general way, over and above the interpretations of the various Catholic theological schools of thought. Duffy summarizes: "At the core of Tridentine* teaching on justification is a hard realism: we truly are *made* just" (canons 3, 7, 11). Underpinning this realism is the scholastic notion of created grace, the *habitus*

...
[thus] "the justice of the justified is properly their own," though, as grace, it is the gift of God (Duffy 1993, 231f).



Clouds over Water

The Intimate Relationship between Nature and Grace

Henri de Lubac, SJ. De Lubac (1967) looked at humans' natural desire for God and wondered how it could "stretch toward" the vision of God without losing the gratuity of the supernatural. De Lubac considered the concept of "pure nature" as expendable. To him there never was such a thing. Instead:

Nature is made for the supernatural and is unintelligible without it, though having no rights over it. For de Lubac the spirit is the desire for God, the most absolute of all desires. This "natural" desire is a gift of God. The whole natural order is "permeated by the supernatural, which works on human beings and draws it on.... God wants to give Godself to human beings; they are obliged to work toward communion with God. The desire interiorizes grace, which remains a free gift" (Duffy 1993, 300-301).

Karl Rahner, SJ. Rahner also pondered the relationship between nature and grace. He developed a transcendental method of anthropology, >according to which a person becomes aware of his or her openness to God in the very act of self-reflection. That openness is to the possibility of a supernatural self-revelation of God. It is also known as the "supernatural existential," namely "human transcendentality and its elevation and illumination by grace" so that humans may be able to hear God's revealing word. (Duffy 1993, 269). This elevation and illumination by grace takes place at creation, which, along with the Incarnation, constitutes the two moments in the one process of divine self-giving (Duffy 1993, 309).

James A. Carpenter. Carpenter (1988) considers the histories of both Eastern and Western thought on grace, including Irenaeus, Augustine, Tillich, Rahner, Moltmann, Whitehead, and others, and concludes:

We are, I believe, called upon to see nature in the light of grace and grace in the light of nature, not as divorceable, not as identical, but as inseparably related and indeed as intertwined in creation. We need to see the physical world as a community with the human community as part of it, and to see the whole as not only in grace, but of grace (186).



Rock Formation

Concupiscence

Bodensieck (1965) defines "concupiscence" as follows: *Concupiscence* designates man's egocentricity before God. Under the influence of Augustine, and operating with an unbiblical psychological dualism, the Middle Ages interpreted concupiscence in predominantly sensual and sometimes sexual terms. Luther, seeking to reassert the essential goodness of creation, interpreted concupiscence as man's self will, his being *incurvatus in se* ["turned in on himself"].... It is not primarily or essentially sensuality, but is man's selfish and evil will which seeks itself even in God's presence (2176).



Apple and Serpent (Symbol of Original Sin)

A related concept, "depravity," is: ... a term which seeks strong expression of sin's binding and blinding power upon man. Sin is not merely a minor ailment but one which fundamentally distorts human life. It leaves man in a situation from which he cannot rescue himself. The defenders of this position (e.g., M. Flacius, *quod vide*) have sometimes been insufficiently dialectical and have expressed themselves too one-sidedly giving the impression that sin has destroyed man's essential humanity. This is a distortion of the biblical view, understating man's dignity and overstating his tragedy (2176).

Original Sin in the Bible as Read Today: Summary and Major Points

Summary. The story of the Fall of Adam and Eve is central to the Christian faith, yet its teaching has become all the more difficult to comprehend in the light of evolution. The tendency of the human heart certainly seems to be in a negative direction, toward that which is selfish, proud, alienating, unloving, brutal. We see its effects every day in the news and in our examinations of conscience. At the same time we are called to live lives of love, goodness, happiness, sharing, compassion. This is a mystery of human existence that the traditional doctrine of original sin has intended to illumine, especially in light of the liberating and transforming salvific life of Christ.

With an attitude of "faith seeking understanding," we have tried to probe more deeply into the literary nature of the biblical texts and of Christian tradition in light of the evolutionary universe of which we are an integral part. We realize the complexity of the issues, but are confident in the grace of God to help us attain our final goal of understanding in peace and hope.

Major Points

- Catholic (and most Protestant) biblical scholars today agree that the creation narratives of Genesis 1-3 do not present literal history in our modern sense, but rather myth. This means that they provide an ahistorical theology of origins that teaches profound truths – neither history nor fairy tale, but an affirmation about the relation of everything in the world to God as Creator. Adam, Eve, and the Garden of Eden were used by the biblical author to dramatize the mysterious, non-divine origin of sin and its consequences.
- Given that humans were actually created according to the process of evolution, aspects of the central church doctrine of "original sin" must be rethought, taking into account both modern scientific data and the mythic context of the Eden story.
- There is within all humans a tendency toward selfishness that is due to their evolutionary origin. This is known among theologians as concupiscence.
- We all need the grace of God (in Christ) to be saved; that grace both "elevates" and "heals" us. It is received in baptism (also in "baptism of desire").
- The doctrine of original sin points not only to continued concupiscence and to one's integration into (sinful) humanity, but also to Christ's redemption, as expressed in Romans 5:12-21: "... where sin increased, grace abounded all the more, so that as sin reigned in death, grace also might reign through righteousness to eternal life through Jesus Christ our Lord" (v. 20).

In explaining original sin today, contemporary theologians acknowledge the fact of evolution and the inevitability of physical suffering and death in a material creation. Many also stress that our birth as individuals into sinful human societies inevitably biases our own free moral choices toward sin. Overcoming this immense negative influence – which is genetic as well as social – requires the grace of God, offered to us in the liberating and transforming salvific life of Christ.



Church of the Holy Sepulchre, Jerusalem

Original Sin in the Bible as Read Today: Discussion Questions

- Why does Pope John Paul II reject some forms of evolutionary theory while accepting others?
- Is it legitimate to apply categories of literary genres (such as symbol and myth) to Genesis 2-3, the narrative of Adam and Eve? Why, or why not?
- If one were to look for "elements" of a teaching on original sin in the Old and New Testaments, what would they be?
- How do the Greek Fathers understand the issues of grace and original sin?
- What is St. Augustine's understanding of original sin? Does the Council of Trent deviate from this teaching?
- Why do modern theologians seek to reinterpret the traditional doctrine of original sin?
- What is the basic understanding of original sin according to each of the following theologians:
 - a. Pierre Teilhard de Chardin
 - b. Karl Rahner
 - c. Piet Schoonenberg
 - d. Paul Tillich
 - e. Herbert Haag

- How do theologians understand the relationship between nature and grace?
- How would you define concupiscence?
- What might be the advantages of newer theological understandings of the Church's doctrine of original sin? Disadvantages?



Genesis Chapter One

A New Interpretation of Original Sin

by Daryl P. Domning

Original Sin and its Evolutionary Roots in Animal Behavior

In "Evil, Ethics, and Human Values in an Evolving World" above, we saw that our innate selfishness is shared with all other living things—necessarily so, because natural selection requires living things to see to their own needs first as the price of survival. And as we examine those animals that are more closely related to ourselves, such as the great apes, we see ever-more obvious resemblances to our own behavior. These include not only the cutthroat competition usually thought of as "Darwinian," but cooperation as well, and even a rudimentary sense of ethics.

The self-interest that often motivates cooperative and ethical behavior even in ourselves makes it sufficiently clear that natural selection can explain these traits as well as the cruder forms of selfishness—all of which have been further developed by cultural evolution added to our genetic heritage. This course of evolution has had the important by-product of laying the foundations for the "true" altruism that we now hold up to each other as our ethical ideal. This ideal has emerged gradually over the many millennia of human civilization, but it was argued above that it was brought into particularly sharp focus by the selfless life, teaching, and freely accepted death of Jesus of Nazareth.

Given the evolutionary background we have described, seeing the "Jesus event" as a watershed in human ethical history implies that it was also a turning point in organic evolution on this planet. Previously (and to a shameful extent, subsequently!), human culture developed according to Darwinian rules, in clear continuity with the whole sweep of evolution: the highest priority of each individual has been his or her own self-perpetuation. Beginning with Abraham, however, and culminating most clearly in Jesus, it was progressively revealed to us that God wants us now to live by different rules.

According to these new rules, our highest priority should be the Kingdom of God, a state in which we seek above all the good of the other. The difficulty we have in doing this—the tension we experience between the old rules and the new—is what Christians have tried to explain by the doctrine of original sin.



Holding the Cross

A New Interpretation: Original Sin as Evolutionary Selfishness

Science, through its explication of evolution, has made untenable the traditional form of that doctrine, which is based on a too-literal interpretation of Genesis 1-3. We now know beyond reasonable doubt that the "Adam" of "the Fall" was not responsible for introducing physical suffering and death into nature, nor was any other human being. Neither, as shown, can poor Adam be blamed for all the forms of mayhem that we humans inflict on each other. Those were well established among evolving organisms long before his and our advent.

On the other hand, the essential spiritual insight of the creation account that is revealed using literary and mythic analysis—that humans and humans alone have a moral dimension to their actions, and have chosen to act immorally (i.e., selfishly) from the very dawn of their existence—does not contradict anything that science knows of human origins. On the contrary, it is precisely the behavior that Darwinian theory would predict. This is true regardless of whether we descend from a single couple or from a large population of "first humans."

The reason why the Christian tradition began to insist on some form of monogenism (descent of all of us from a single couple) was not based on any biological considerations, but rather on the simple need to explain why all human beings had to be saved from "original sin" by Christ's sacrifice. *The only compelling theological reason to postulate a literal Adam was in order to account for the universality of sin—because, in a static universe, there is no other way to account for it.* This is the source of the difficulty. Given what is written in Genesis 1-3, it was inevitable in Western thought prior to the discovery of evolution that whatever was universal to the human race should have been ascribed to inheritance from Adam and Eve—at least whatever stemmed from sin, since only humans among earthly creatures can commit sin.

However, has there not always been an unexamined assumption here: that both the *universality* and the *moral character* of original sin necessarily stem from *one and the same* individual, act, and moment in time? We can define original sin simply as *the need for salvation (by Christ) that is universal to all human beings and acquired through natural generation*. Might we find any such universal, naturally acquired need in an evolutionary worldview?

What I have sought to show above is that the *overt selfish acts* that, in humans, demonstrate the reality of original sin (by manifesting it in the form of actual sin) do indeed owe their universality among humans to natural descent from a common ancestor. But this ancestor, far from being the biblical Adam, must be found in the very remote past at the very origin of life itself. It was the common ancestor not only of all humans but of all other living things on Earth as well. However, it is not this ancestor itself that interests us, but the "natural descent" that proceeded from it, the very nature of physical life and the process of natural generation, which, we have seen, are governed by natural selection and the selfish behavior it requires. And this requirement applied equally to the first living thing and to every one that followed it.

In other words, the human acts themselves share a genealogical unity (the common origin of all life), but their sinfulness arises from a development that is logically and temporally separate from their common genealogical origin, much more recent, and not necessarily unitary (since the necessary universality is already supplied by the genealogical inheritance of inclination to perform the acts). The definition of original sin given above requires that it apply universally to all humans, which implies (following the principle of parsimony) that our sinful acts began with some common ancestor of ours. Since this is true of the (selfish) acts themselves (which began, indeed, with the common ancestor not just of us but of all life), the requirement is met, whether or not our acquisition of free will and moral responsibility (which made the selfish acts *sinful*) happened only once or more than once. This explicit logical differentiation, and radical historical decoupling of the source of original sin's universality (the common origin of life) from the source of its moral character (human free will) is the key to the problem.

The key to understanding original sin is to decouple the genealogy of our behavior from its morality.

Advantages of the "Evolutionary Selfishness" Interpretation over the "Cultural Transmission" and Other Interpretations

This concept of original sin does not exclude those of Schoonenberg and most other post-Vatican II Catholic theologians, who (as outlined above) tend to equate original sin with the sinful situations or structures into which each person is born. However, the concept of original sin proposed here significantly broadens and deepens this "cultural-transmission" model of original sin to include the environmental, social, and behavioral situation into which *humanity itself* was born—"the society before (human) society" that was molding our ancestors' behavior (both learned and genetically determined) for millions of years before they became human.

This addresses a central weakness in the "cultural-transmission" model: its failure to explain where the sinfulness of human society came from. What previous human sins were there to condition the situation of the *first* human beings? The "cultural-transmission" school does not even ask this obvious question, even though it claims to be in harmony with evolution. Instead, it has redefined the problem, restricting it

to how original sin is now transmitted to each of us. This is admittedly the more practically relevant question, and the one at the heart of the doctrine of original sin, properly understood. On this point these theologians have contributed valid and valuable insights. But without returning to the question of origins, no complete solution to the problem is possible.

As argued above, the substance of original sin is partly the genetically inherited and partly the culturally inherited legacy of *prehuman* selfish behavior. The corrupting influence that greeted the *first* humans ever born, when no *human* culture yet existed, was obviously the prehuman culture that included our genetic heritage of selfishness (which is also the ultimate source of culturally learned selfish behavior).¹⁴

Just as important, our concept retains an ingredient that is central to the traditional understanding of original sin but is missing from the cultural-transmission model: *original sin is identified with some definite trait that is passed on by "propagation" or "generation" as part of our human nature, and not merely by imitation.* I have identified this trait as the biological "selfishness" (the instinct for self-perpetuation) that is literally programmed into the genes of all living things. In no way do I discount the insidious effects of a sinful social milieu on the young, nor do I deny that culture can be thought of as integral to "human nature" and hence that its transmission can in a sense be considered integral to "human generation."

Although "original sin" really describes our present moral situation and not our past history, we also want to know how evil really began.

But I give greater concreteness to the concept of original sin by connecting it with a known biological phenomenon, and incidentally bringing it back into agreement with the traditional understanding of original sin as something literally transmitted by human propagation.¹⁵ Our inclination to sin, or "concupiscence," is propagated *together with* all other aspects of our humanity: it is integral to and inseparable from our human nature itself, because of how our human nature was brought into being. In short, *evolutionary selfishness is a necessary and sufficient explanation of the sinful social structures on which the "cultural-transmission" school blames our individual sinfulness.*

Evolutionary selfishness and harmful acts. The Council of Trent declared in 1546 that concupiscence remains after justification by grace, but original sin does not. My decoupling of the (genealogical) universality of original sin from its moral character offers a different way to distinguish between (1) that which is passed on by generation and can be attributed even to animals ("evolutionary selfishness," the inclination to act selfishly), and (2) that which can be attributed only to humans (the inherited inclination to commit *sin* in the strict sense: culpable choice by a moral agent to act on selfish desires that are harmful, resulting in actual sin and guilt).

Only the combination of these two elements constitutes what we term "original sin" (or better: "*original selfishness*") and calls for grace and salvation. Both elements remain in us, however, even after Baptism, so we should not say that Baptism "removes" original sin, but that Baptism and other sources of grace simply enable us to *transcend* our original selfishness. Grace builds on and perfects nature, rather than replacing it.

Handicapped by inheritance. This view thus preserves the traditional insight that our real individual situations are different from the mythic Adam's—that we do not start our moral lives with a clean slate, but are in some way handicapped by

inheritance: the inheritance of a proneness to sin. The literal "Adam" himself, however, must be seen in retrospect as only a literary device to explain, in the context of the Genesis narrative and its static worldview, the ultimate source of this inheritance, for which a more concrete explanation now presents itself.

The great virtue of the "cultural-transmission" approach is its focus on the practical meaning of original sin for our everyday lives. The Schoonenberg school rightly recognizes Eden as an etiological myth (an ancient attempt to explain how we got into our present fix) that is secondary in importance to confronting the practical problems at hand. But we human creatures, embedded in history as we are, still need etiological myths, even in the twenty-first century—only now we demand of them not only mythic power but historical concreteness as well.

Our era, the era of historical geology and evolutionary science, is the first in human existence to have acquired means of exploring deep time and of discovering something of our true origins. Nothing less will do anymore. We want not just etiological myths but literal etiology, a story of our origins based on actual scientific data that places real value on our actual past as well as on our present and future. The great virtue of Christianity is that it can support and encompass this kind of etiology that is not only myth but fact.

Original Sin, Grace, and Salvation

A definition of original sin used previously called it a "need for salvation by Christ." What implications does our evolutionary concept of original sin have for our theology of salvation? It makes salvation history more coherent, and more consistent with the idea of a Creator who made the universe all of a piece and functioning as intended from the start, needing no ad-hoc adaptations or repairs along the way, but at most merely a planned-for mid-course correction.

The difficulty with original sin in this context is largely a semantic one, and arises from the connotations of the words "sin" and "fall." Theologians, of course, have always insisted that original "sin" does not in itself imply personal guilt on the part of Adam's descendants; yet this term nonetheless continues in use. Would it not clarify things, and remove some difficulties, to speak of original "sin" as *original selfishness*? Infants, for example, are guiltless of sin, but undeniably self-centered. This self-centeredness is in them by natural generation and is necessary and good for their survival, yet it is an obstacle to an eventual relationship with God. Hence they have the same need for Christ's salvation as all other people (as the church has always taught), even though they are as yet innocent of actual sin.¹⁶

Would it not clarify things and remove some difficulties to speak of original "sin" as original selfishness?

Related to this semantic problem is our habit of describing our sinfulness as "disordered"—as though it were in some sense chaotic, confused, and/or a distortion of some preexisting moral order. But we are now in a position to be more precise: our sinfulness is in fact very well ordered and shrewdly focused on the attainment of our own selfish interests, just as was the behavior of all our evolutionary ancestors. When we do sin in confusion, our guilt is less for it. Our gravest sins are committed with a clear head and cool deliberation. Our internal moral order (such as it was and is) has not broken down; rather, with the dawn of human conscience, the rules of the evolutionary game changed and the bar was raised. It is not that our behavioral

gyrocompass has suddenly spun out of kilter. It is merely trying to keep us on the same old selfish course, when the time has come in our evolution for a radical course change.

Similar problems arise from the word "Fall," which inescapably *Was there really a fall?* connotes a downward movement. Sin is metaphorically a step downward from virtue. But is not the knowledge of good and evil (gained even, perhaps only, through sin) in another sense a step upward from moral unconsciousness? The story of the Garden of Eden, which parallels the ubiquitous ancient myth of the Golden Age, emphasizes the former metaphor; with its image of humanity's "fall," and consequent need for salvation pervades Christian thought. Yet this central theme of salvation history can be expressed in other terms that do not convey the same subliminal (and inappropriate) impression of a God whose original, idealistic plan for creation was doomed in practice to fail.

God—who had decided to create by means of an evolutionary process driven by selfishness—was perfectly aware of the limitations of the first human beings who would emerge from that process. Only one step up from the apes, with no previous human history to guide them, they were surely the least likely of all people to avoid moral mistakes. Of all humans who would ever exist, they bore the least resemblance to the preternaturally endowed, superhuman Adam of my childhood catechesis. God could not have considered their sins more momentous than those of any subsequent miscreants, or held them accountable for any special moral "headship" of the entire human race. (To do so would be analogous to condemning infants because they need toilet-training!) On the contrary: the God who loved us when we were still sinners (Romans 5:8) surely viewed their moral blunders with forbearance (as we view the misdeeds of children), seeing them as a necessary consequence of the process that had raised them to the human plane.

As a result, even today our sins have "an aspect of immaturity" (Schoonenberg, 1965b). God knew from the beginning that in the fullness of time, like children needing moral training, humans would need divine help to transcend what selfish evolution had done for them. They would need a divine example of altruism that would transcend mere reciprocal altruism, an example whose actions would make possible for them the personal relationship with God that God had intended all along (see John 3:17). This personal relationship with God, in turn, would include collaboration with God as co-creators of the universe, putting the finishing touches on it by actually helping to build what archaic traditions imagined as the timeless Golden Age, what the author of Genesis 2-3 portrayed as the primeval Garden of Eden, what Isaiah 11:1-9 envisioned as a future paradise, and what Jesus described as the already-begun Reign of God.

In short "the Fall" was inevitable. The old selfish behavior was freely chosen, predictably though not deterministically, by all our early human ancestors, as it has been (and more to the point) by ourselves today. Even the greatest saints do, like Paul, that which they wish not to do (Romans 7:15), and Paul's analysis of this situation could not be more congruent with what modern evolutionary science reveals: "My inner self agrees with the law of God, but I see in my body's members [read: in the inherited sources of my behavior] another law at war with the law of my mind; this makes me the prisoner of the law of sin in my members" (Romans 7:22-23).

We all acquire, through natural generation, the need for salvation by Christ, which by

the above definition is the state of (passive) original "sin." But the cause of our being in this state lies in a natural, necessary evolutionary process, not in any single "active original sin" committed by some "Adam," which is now seen only as fiction.¹⁷ Because our natural, selfish urges lead us to do injustice to others, the salvation we need consists in making our responses to these urges more just, and is aptly spoken of as "justification." The Incarnation and Redemption were part of the plan from the very outset (see Ephesians 1:4-14, 3:9-11; 2 Timothy 1:9-10; 1 Peter 1:18-20). We even acknowledge this in the Easter liturgy when we paradoxically extol the "necessary sin of Adam, which gained for us so great a Redeemer." For this reason the proper focus of the Christian doctrine of original "sin" is on Christ, the historically real "second Adam," and not on his allegorical counterpart the "first" Adam.

The view advocated here points us in a direction now being taken by many theologians (an outstanding example is Campbell 2000), who regard as salvific the life, teaching, example, and relationships of Jesus—and not, strictly speaking, his death on the cross. Salvation, then, must involve God presenting us with a plan or pattern for how we are to reform our lives. That pattern is Jesus. The cross was simply the price, under the normal conditions of life in our world, that Jesus inevitably had to pay for his prophetic actions—the natural outcome and the symbolic culmination of his mission. It was also the ultimate demonstration of how astonishingly far God was willing to go on our behalf. To say we are saved by the cross of Christ is simply theological shorthand for all that Christ did for us.

The world as a work in progress. God responded to this need, these limitations of ours, by sending aid—freely given and unmerited on our part—in the form of the Son and the Spirit. What they will accomplish with our help, and what we could never accomplish on our own—the building of the Reign of God or of "Eden"—is thus in essence a free gift of God (see Isaiah 26:12, 18; Luke 1:78-79; Matthew 19:24-26). At the same time, this indispensable gift of God purposefully left the building of God's reign incomplete. It left something for us to do in partnership with the Creator. In no way other than through such a process embedded in history could we come to have a personal stake and role in the outcome.

The Creator's plan for the universe required some assembly—in fact a great deal of it. Creating our universe in six days was simply impossible, as much as was the proverbial building of Rome in one day. To be sure, God might have created instantaneously something that *looked* like our universe, much as Cecil B. De Mille could call into existence a movie set that resembled ancient Rome. But the proverb about Rome is based in part on the fact that a real city is not just an arrangement of buildings, or even a crowd of people; it is an integrated community with a history extending through time, and its value in our eyes is inseparable from its time dimension and its history of organic growth.

As for our universe, special creationists implicitly admit the necessarily artificial, "movie-set" nature of a six-day creation when they postulate that the world was created with an "appearance of age"—for example, that the light seemingly emanating from stars millions of light-years away was actually created *en route*, and has not really spent millions of years on its journey. This, of course, is just a "space age" version of the old arguments that Adam had a navel despite his never having been inside a mother's womb, or that fossils were created inside the rocks where

they are found. It equally implies a certain deceitfulness on the part of a Creator who would fill the "set" of creation with such "false fronts" at every turn. More plausible and palatable, especially to those who conceive of the divine as trinitarian (and hence as a community in itself), is a Creator who wills an authentic, organically- and historically-connected community of creatures.

Like a real human community or a real universe, the Reign of God is something that by its very nature could not be brought into being by divine fiat. When Jesus went through cities healing the sick one by one, he could perhaps have raised his hand and cured all the sick of the world in an instant. But he did not. Instead, he urged his disciples to finish the job, promising that they would do even greater works than his (John 14:12). He had come, after all, not to establish universal health care on earth, but to establish the Reign of God, and to show how it could be done. The man born blind does not owe his blindness to sin; "rather, it was to let God's works show forth in him" (John 9:3). In the largest sense, the inherent limitations of our imperfect universe—born out of blind evolutionary forces and still beset by moral blindness—do not derive from sin. But they will reveal the glory of God's work when the world is brought to its eschatological* perfection. This work of God comes about not by fiat but by invitation. The role of chance in the world's origins is no cause for scandal.

This evolutionary view thus presents a very different, more parsimonious, and less jaundiced picture of human history than the logical alternatives. Rather than humans having been specially created at a pinnacle of perfection from which they immediately "fell," only to begin a painful reascent with divine help, they followed a long "upward" path of progress from "lower" forms of life that was interrupted by the same "Fall" just as the threshold of human nature was reached. To us, it is far more consistent with the image of a unitary creative act and a consequently seamless creation to visualize human origins and human history as a story of generally "upward" progress (however slow, blind, halting, and sporadic), which led first to moral consciousness and only later to moral improvement.

A good or a "fallen" creation? Traditionally, Christian theologians described not only humanity but the entire universe as in some way "fallen" due to the sin of Adam. What I suggest is the somewhat paradoxical notion that the universe *as it came from the hand of the Creator* was both good and "fallen" at the same time. The world, while imperfect or unperfected, can be perfected with the help of grace. (Here we see once again the awkwardness of using the term "fallen" to describe something that has not in any meaningful sense "moved downward," but simply has yet to move further "upward." We cannot conclude from seeing a man at the foot of a ladder that he has fallen off it; he may never have been on it to start with.)

Sin (moral evil) came into the world with humans, but selfishness, death, and other imperfections (physical evil) were present from the origin of life. Selfishness was a necessary ingredient and mechanism of creation-by-evolution, but was eventually to be transcended through our salvation. God, after all, said only that the created world was "very good," not that it was perfect.

Undeniably, our environment has suffered in countless ways from the sins of humanity (overpopulation, pollution, climate change, extermination of species, unsustainable exploitation of resources, etc). But it is not helpful to say that the

"world" apart from human society and its immediate environs is in some theological sense "fallen." Selfishness, ingrained in all life and in evolution, forms the historical substrate and raw material of our own sinfulness. But like .. spent booster rocket lifting astronauts into orbit, it is more useful to speak of it as limited in its potential than as "fallen" in its condition.

In this view, rather than human sin having brought about all the imperfections of the world, it is more nearly the opposite. Those imperfections were built into this world by its Creator (see Romans 8:20, 11:32). While the inherent limitations of this material world set the stage for our sinfulness, the final decision is always ours. Free will and human culpability (given the availability of grace) are neither excluded nor diminished (see Sirach 15:11, 20a; James 1:13a). The blame and responsibility for the moral evil that pervades our world are ours alone, because this evil (unlike physical evil) stems from individual human choices made with full consciousness that we could choose differently.

That unconscious organic evolution which still goes on endlessly around us, and which made us so selfish that the total avoidance of sin is beyond our mere human power, has also raised us up, preparing us to become its own consciousness and conscience, a role into which we still struggle to grow. As the Catholic tradition has long repeated, "grace builds on nature." We each need Christ's saving action to overcome our original selfishness and answer his call. But there is more. Human behavior is so deeply rooted in the entire evolution of the universe that the cosmic salvation glimpsed by Paul, in Romans 8:19-23, is seen—clearly and grandly—to include salvation, not *from* space, time, and matter, but also in and of them.



Earth (showing Hurricane), Moon, Stars

Are there fates worse than death? Perhaps by this point the Christian who is skeptical of Darwinian evolution is willing to concede a certain logical coherence to the foregoing. Yet no mere intellectual assent seems capable of expunging his or her gut feeling that a good God would not tolerate the suffering that an evolutionary universe must entail. What more can be said to assuage this existential anxiety?

As I discuss in the Appendix, there are logical responses to the objection that Darwinian evolution is "cruel" and "wasteful." But we must clarify what we mean

by terms such as "suffering." When we think of suffering in nature, what first come to mind are all the unpleasant ways in which animals can die: predation, parasitism, disease, starvation, complications of giving birth, and physical accidents, for instance. But it is not likely this kind of suffering that bothers us the most. Most people, for example, think it is justifiable to inflict pain on animals in the course of important medical research that cannot be done any other way. In fact, we seem ready to tolerate almost any amount of suffering in ourselves or others, so long as it serves some purpose. Suffering and dying for one's country, family, religion, ethical principles, etc., are even praised and encouraged.

The real horror is *futility* i.e., suffering (and for some even life itself) that has no purpose. The myth of Sisyphus, who eternally rolls his stone uphill again and again, is a classic view of hell as pointless make-work. Cyclical repetition, devoid of reason and hope, is our ultimate nightmare.

This sense of futility is what creation is groaning in anticipation of release from in Romans 8:18-23. We progress-minded Westerners (imbued with the biblically inspired optimism noted in "Biblical Origins of Science" above) all want to move forward, taking part in some genuine advance, rather than to be mired in an everlasting standstill or futile repetition. But modern evolutionists are quite right in pointing out, contrary to superficial teleological* thinking, that evolution does not necessarily or automatically produce "progress" in most individual lineages. (Many would deny it ever produces progress, though I disagree.) Since the overwhelming bulk of evolution is not leading evolving organisms anywhere beyond their next meal or their next mating season, and since most of them meet with unpleasant ends along the way, it would seem there is plenty for creation to groan about.

A time-honored response to this existential agony is simply that of faith. Job can accept his suffering because he has faith that God's wisdom, though unfathomable, can be trusted. The New Covenant gives a more explicit reason for this faith. It promises that the subjection to futile repetition is "not without hope" (Romans 8:20). Hope lies in the purpose of creation, as can be seen by linking Romans 8:18-23 with John 16:21 (when a woman has borne her child, she no longer remembers her pain). If the evolution of intelligent life—capable of freedom and love—and the realization of the Reign of God are sufficient purposes for creation as a whole (as I think they are), then all else finds its purpose in its contribution to those ends. Every creature's death that results from natural selection improves the adaptation of its own lineage. Every death without exception feeds other organisms, continues the flow of energy and nutrients in the biosphere, and keeps the whole process of life and evolution going. The creation, which finds its consciousness in humanity (and in whatever other intelligent life there may be on other planets), both senses its suffering through us and recognizes through us that it has not been in vain. In the end it will "no longer remember its pain."

And lest there be any doubt, it is also spelled out for us how we are delivered from this futility that we see in so much of both human and evolutionary history: "Realize that you were delivered from the futile way of life your fathers handed on to you, not by any diminishable sum of silver or gold, but by Christ's blood beyond all price: the blood of a spotless, unblemished lamb chosen before the world's foundation and revealed for your sake in these last days" (1 Peter 1:18-20).

As it is, the world has actually accomplished something by its labor and groanings: it

has brought forth life, in amazing diversity, and intelligent life to boot. Furthermore, at least on this planet, all living things are not just figuratively but literally each other's brothers and sisters. All of them are connected in an unbroken chain from the first burst of primordial energy, to the first bacterium, to us and to Jesus himself. The very atoms of our bodies were manufactured in stars that formed and exploded eons ago, scattering their substance as the dust from which our own solar system and its inhabitants were made. In fact, we could not have been made—our own multi-billion-year evolution could not even have begun—until after these earlier generations of stars had come into being and passed away.

And that was only the beginning. "Life in human beings has an age of more than three billion years: from the beginning the chain has never been interrupted. Every human being is alive with a life that started shortly after the formation of the earth. In a precise sense, every human being incorporates the condensed history of the universe from the beginning of the formation of protons to the formation of the brain" (Schmitz-Moormann 1997, 52).

As Charles Darwin said, "There is grandeur in this view of life."

Is there an alternative? Yes, countless creatures have had to suffer and die along the evolutionary way. But a universe in which an animal could never be killed is unimaginable. For example, for it to be impossible for an animal to be killed by lightning, we would have to live in a universe in which there would be no lightning, or electricity, or weather, or electrons, or physical laws anything like the ones we know—including evolution (and thus not even the animal itself). Probably such a universe could not even be fashioned out of matter and energy. We know from daily experience that anything made of parts can come apart, and that the more moving parts something has, the more prone it is to break down. Every particle in creation is made up of smaller particles, quarks, "strings," or other entities, all in motion; and nothing in the known universe has more of these moving parts more complexly organized than a human body. So long as we and worlds are made in this way—so long as physicality is synonymous with multiplicity of parts—it is impossible that breakdowns of every imaginable sort could be avoided. God could no more make an unbreakable physical universe than a square circle. Hence, *the physical "evil" of animal suffering is inseparable in principle from even a good creation, just as the real evil of sin is inseparable from a creation in which intelligent creatures have free will.* God doesn't need to make excuses for this. It's part of the price we pay for all that is desirable in creation; and taking the package as a whole, it's worth the price.

*Anything with moving parts
can and will break down—
from atoms to us.*

The moral dimension of our consciousness, and the moral evil that results from human traits such as aggression, evolved out of the physical world and physical evil, just as learned behavior and ultimately culture evolved out of instinctual behavior. But this phrase "evolved out of" does not imply that the older traits have been left behind, or even that they no longer serve a constructive purpose. Without the interplay between antagonism and attraction in our societies, and without clashing individual interests, we would lose our individual identities and the role-division that makes possible social cooperation—even the harmonious complementarity among the differentiated members of the Body of Christ (see 1 Corinthians 12:4-30; Romans 12:4-8; Ephesians 4:11-16).

In the midst of our suffering, God "not only provides and protects (like a father) but also ... suffers with us so that something new may be born as a result of this suffering (like a mother)" (Sonnenberg 1995). We come into the world bawling our heads off, complaining of our discomfort, and completely oblivious to the decades of life and hours of labor our mothers have gone through to bring us to this point. Later, we complain that God does nothing about the suffering we encounter in the world—equally oblivious (see Hosea 11:3-4) to the billions of years of bringing-to-birth necessary to produce creatures capable of such complaints, and also capable of doing something ourselves, as members of the Body of Christ, to mitigate the suffering. We need to take a larger and more mature view.

It seems natural for human beings confronted with random disaster to ask why God wills or permits this; and, receiving no convincing answer, to doubt God's beneficence or even existence. In Mark Twain's pessimistic story *The Mysterious Stranger*, an old woman declares her faith that not a sparrow falls to the ground without God seeing it. "But it falls, just the same," replies Satan. "What good is *seeing* it fall?" It is bad enough to suffer the loss of possessions, health, life, or loved ones, without losing one's faith as well. That, at least, is avoidable.

Consider the relationship between the very young child and the parent. The child lives in a seemingly irrational world in which the parent is all-powerful. An unpleasant event, such as a treat denied, a shot administered by a doctor, or even an illness or natural disaster, is something arbitrarily willed or tolerated by the parent or something that the parent failed to prevent. So the child may blame the parent for the consequent suffering. It is only as we grow older that we realize that some of those "misfortunes" against which we railed—such as the vaccination—had a logic to them that a child was unable to comprehend. We even come to realize that there are limits to a parent's power to prevent really bad things from happening.

One of the greatest advances in our intellectual maturation as a species was the discovery of evolution. Only now are we beginning to realize how an evolutionary, material world really works. Take the simple fact that all material things have moving parts, and all things with moving parts are subject to breakdowns. This is a law of nature whose necessity not even God, the lawmaker, could evade: *God's decision to create a material world could only be a decision to create breakable (and ultimately broken) things.* And nothing in the known universe has more moving parts and more ways to break down than a human being. A parent—or God—could protect a child completely from "physical evil" only by not bringing that child into existence at all.

God's decision to create a material world was a decision to create breakable, and ultimately broken, things.

The case of moral evil is no different. None of us would willingly give up free will, even though selfishness threatens its exercise with perversion at every turn. Without that original selfishness, however, life could not have evolved and we would not exist. God's decision to create material beings with free will could only be a decision to create sinners.

Applicable to both physical and moral evil, then, is the punch line of Jesus' parable of the weeds and the wheat (Matthew 13:24-30): "pull up the weeds and you might take the wheat along with them. Let them grow together until harvest." God's ways are not like ours, impatient as we are for what we fancy to be "justice." We are like the heretic-hunting Catholic abbot Arnaud Amaury, who in 1209 ordered the

massacre of the suspect townspeople of Béziers, saying, "Kill them all; the Lord will recognize his own!" Jesus, in contrast, says: "Save them all; the Lord will recognize his own!" Not only human sinners, but even natural phenomena of which we disapprove, may play such important roles in the divine plan that uprooting them might cause disruption beyond our imagining.

Although the inherent limitations of the material universe are not the result of an "enemy"'s sabotage, the constraint they place on God's action is the same. Just as an immediate divine curb of sinners would take away our free will and our meaningful participation in bringing about the Reign of God, so God could intervene to prevent natural mishaps or ameliorate nature's "cruelties" only at the cost of taking back all the control of events that had originally been delegated to natural laws. So why delegate it in the first place? Such interventions would be needed literally countless times every second to make the "kinder and gentler" world of nature that critics of evolution would like.

Neither could the critics be appeased by God preventing only the "worst" tragedies. If no child ever died of cancer and the worst suffering known to us were a stubbed toe, we would still cry to heaven against the injustice done to our bruised digits. Or if, instead, we really were spared all physical and mental discomfort and lived in a permanent state of anesthetized bliss, the result would not resemble Eden so much as Aldous Huxley's *Brave New World*. Until the "harvest" of the Last Day, then, God must refrain from either breaking or binding up the bruised reeds of this world (Isaiah 42:3-4) in ways that might compromise the greater good of an autonomous creation.

A humble or a disciplinarian God? Theistic evolutionists sometimes make the mistake of saying that God *chose* to create by means of evolution, when in fact no other choice was available. "Special creation" of things as they are today was not a practical alternative: Mr. De Mille could not have shut off his cameras, walked away from his movie set of ancient Rome, and then expected it to come to life as a real city. Pinocchio, and Pygmalion's Galatea, come to life only in storybooks. God the Father no more made Adam directly from clay than did the apocryphal boy Jesus bring clay birds to life. That was not an option.

Failure to recognize that God had no choice but to create by evolution explains why the notion of God's humility, now much discussed among theologians, is so readily misunderstood. In particular, theodicy asks: How can a God who is both almighty and benevolent tolerate evil? Seemingly, the creator of this suffering world cannot be both; if God were almighty and benevolent there would be good without evil. So if we insist on a benevolent God, we must accept one whose powers are limited.

A self-humbling God, who cedes power over the world to the world's own laws, seems like just such a weak God, one that is not almighty. Process theology, however, plausibly holds that a God who acts through persuasion (as can be seen in Jesus' example) can actually exercise far greater influence on events, and hence greater power, than one who uses brute force. This is because a world with the freedom to help create itself has much more integrity and value than a puppet-like

Creating a material world in which bad things don't happen is impossible, even for God.

universe that is coerced into being; and the Creator is greater to the extent that the world created has greater value.

This God is like any good parent—like the father of the Prodigal Son—who allows freedom, who does not coerce, who longs for the child's return, and who rejoices with him in the end.

Why, then, does evil remain? Not because God has gratuitously given up the power to prevent it. The key to the paradox is simply to realize that banishing evil from an autonomous world involves a contradiction, and is therefore impossible, even for God. On the other hand, a non-autonomous world, even one without evil, is not worth creating. The "power" to do the impossible is illusory; hence there is no meaning in saying that God "surrenders" it. Inability to do that which intrinsically cannot be done is no real limitation on God's power.

Just as inadequate to explain evil as is God "choosing" to create by evolution is the idea that suffering and death are somehow spiritually good for us: that we learn something from them, that they build character, that acceptance of them shows our obedience to the Creator, that without them we would not appreciate the gift of life. All this may be true. But to the extent this idea implies that God deliberately created suffering and death for just these purposes, it is seriously misleading. Such "benefits" should be seen as by-products, at best, of laws necessary to this or any physical universe—not as the fruits of training gratuitously inflicted on us by a divine drill instructor.

Why, then, does evil remain? Not because God has gratuitously given up the power to prevent it. The key to the paradox is simply to realize that banishing evil from an autonomous world involves a contradiction, and is therefore impossible, even for God. On the other hand, a non-autonomous world, even one without evil, is not worth creating. The "power" to do the impossible is illusory; hence there is no meaning in saying that God "surrenders" it. Inability to do that which intrinsically cannot be done is no real limitation on God's power.

From this we can see that suffering of all kinds (from a stubbed toe to the Nazi Holocaust) is even more intrinsically a part of the human condition than we ever suspected. We could dodge it only by not existing at all, and God could shield us from it only by not creating us at all. Can this be a source of comfort to the afflicted? Is it comforting to the sick child to know that its parent can do nothing to prevent or cure the illness? Is it comforting to the adult to realize that human suffering and death cannot be altogether prevented, even by God? In itself, no. But the first step in finding comfort is to stop looking for it in the wrong places.

Only when we have accepted the reality and limitations of life in a material universe, and have dispelled some of the confusion about what we can reasonably expect of God, can we then see clearly that the ultimate comfort God offers us lies in "new heavens and a new earth," a dominion built on different principles from those of the Darwinian world, and a dominion we ourselves are invited to help God build. "He shall wipe every tear from their eyes, and there shall be no more death or mourning, crying out or pain, for the former world has passed away" (Revelation 21:4).

Yes, this mysterious dominion will be fully realized only in the distant future, but it is not a mere "pie in the sky" possibility. It is here and now, active in changing our world, and already well advanced in its construction. "The reign of God is already in

your midst" (Luke 17:21). And when, with God's help, we have entered this new existence, God will no longer remember our sins (Isaiah 43:25), and we will no longer remember our pain. "You will suffer in the world," promises Jesus. "But take courage! I have overcome the world" (John 16:33).

A New Interpretation of Original Sin: Summary and Conclusion

Christians who thought in terms of a static cosmos formulated the traditional doctrine of original sin to solve the otherwise intractable "problem of evil." But this "problem" is now seen to be no different from the objections raised in every grade-school catechism class whenever the topic of God's power comes up: "Can God make a square circle?" "Can God make a rock so big he can't lift it?" Or (we can now add) "Can God make a world in which bad things don't happen?" The answer, in each case, is: "No, because that would involve a logical contradiction." The real problem has been that before the discovery of evolution, we never realized that such an ideal world would involve contradictions.

These contradictions stem basically from two things: free will and the composite nature of matter. The role of free will is easily grasped: it has always been clear that moral evil, or sin, results from bad choices by people, and that God had to leave us room to make bad choices so that we would also be able to make good choices. Only slightly less obvious was the fact that physical evil (accident, disease, death) is in every case a result of things coming apart or breaking down in some physical, mechanical way. And since all material things, from subatomic particles to (especially) us, are made of separate, moving parts, they will inevitably come apart sooner or later.

What was not at all obvious, until we learned to see the world as a product of evolution, was this: *there is a continuity, a connection, between the simple breakability of physical things on the one hand, and our own intelligence and free will on the other.* It is precisely matter's inherent tendency to breakdown and disorder (mutation in the genetic material, for example) that is used by Darwinian natural selection as a source of raw material to build ever more complex living things, and ultimately intelligent ones. The process takes an immensely long time and involves the deaths of immense numbers of living things, but the result is a world of living things that are (a) beautifully diverse, (b) authentically related to one another by real genealogical ties, and (c) capable (in us) of entering into a personal relationship with their Creator.

Is the gain worth the pain? Not if there was an easier way to do the job, but the alternative is an illusion. If God had created the universe all finished and ready-made, as we once believed, it would simply not work as we see it working today, for a host of physical and biological reasons. It would not even be a real, organically grown, dynamic universe such as we know, but only a static simulation of one, like a movie set. In particular, it would not be a world of real relationships among God and the other persons who inhabit this world—passionate relationships deeply felt (by both God and us) because deeply rooted in a history of change.

When we confront suffering and death, therefore, we can take some comfort in knowing that God is not incompetent or callous, but that there was simply no other way to make the sort of world God evidently wanted. When we are benumbed by the thought of billions of years of evolution needed to fashion us, we are assured by science that nature offers no quicker recipe. If there were a workable shortcut, I

think we can be sure that God would have thought of it. But this is something we could never have grasped intellectually without knowing something of the actual history of our world and how it evolved.

If the key to the riddle of suffering and evil is as simple as the mere breakability of physical objects, why were the great thinkers of the past stumped by it? They knew well enough that things were made of parts, and could come apart, even before they knew about evolution. I suspect, however, that a major obstacle to this insight was the habit of thinking referred to above (in "Nature: The good, the bad, or the ugly?") as Gnosticism, which continues to subtly influence even orthodox Christians. If you start out with low expectations of matter, and with the assumption that spirit, especially God's Spirit, can overcome any limitation of mere matter, then all options seem open, including the pristine perfection of Eden. If the world is now a mess, some creature must bear the blame, and Adam is a convenient Fall guy.

Instead of saying that matter is evil and spirit good, though, we must recognize that elements of what we tend to call "good" and "evil" are present in both. The material creation was pronounced good by the Creator, even though it includes physical "evil" as well as the instinctive selfishness that tempts us to commit acts of moral evil. Our spiritual faculties (including free will) make moral evil possible (it does not exist apart from them), but also make possible positive acts of virtue. Spiritual faculties are needed to morally transcend our natural (material) selfishness.

Authentic, incarnational Christianity is a perennial scandal to the Gnostic way of thinking. Christ's self-humbling, self-emptying embrace of our physical nature forces us to take seriously the significance of matter in the scheme of things—just as God took it seriously. The great artist does not hold his medium in contempt; his glory lies in being limited by it while managing to realize his vision in spite of its limitations.

To recapitulate the entire argument in a few words: Because God is selfless love, the world had to have its own autonomy, free of divine compulsion. For the world to be autonomous and capable of generating novelty, there had to be room for chance or accident. Because matter is made of parts, it is inherently breakable; this is the fundamental source of natural (physical) "evil." Because errors in copying genetic material (mutations) are consequently unavoidable, natural selection has variation on which to work. Because natural selection automatically favors traits that promote self-preservation and self-replication, all organisms are necessarily selfish. Because our inherited evolutionary selfishness (original selfishness or original "sin") inclines us to favor ourselves over others, we (using the free will conferred by our evolved intelligence) often choose to sin. Thus moral evil evolves out of physical "evil." Because perfect unselfishness cannot arise through this natural process, we are all in need of supernatural grace to build on our evolved nature. We need a supernatural example to help us transcend what natural, Darwinian evolution produces: we need salvation by Christ. This universal human need for salvation, arising out of our biological nature, is what the Christian tradition has defined as original "sin." Its evolutionary origins, and the inevitability of evil in a material creation, are now clear.

Some readers will no doubt be put off by my audacity here in giving such a cut-and-dried, analytical, "left-brain" answer to the age-old riddles of evil and original sin.

Aren't these mysteries of faith, Deep Things of God, which are not to be reduced to facile, "scientific" explanations?

My reply is simply: No, they are not. Mystery, in the theological sense, is present wherever God is present, because God is infinite and our understanding is finite. There is still mystery aplenty in God's creation of this stupendous world, in God's unconditional love for us sinful mortals, and in God's response to the evil we create. But, by definition, God is not present in sin. The doctrine of original sin was never a statement about God. It was only an anthropological statement about human sinfulness and the natural (not divine!) origins of evil. Therefore it has never been a "mystery" in a strict theological sense, but only a *problem*—one lying wholly within the created order, and hence fair game for the natural scientist. In the end, this is what accounts for the fact, noted by Chesterton (1909), that original sin stands alone among classic Christian doctrines in being empirically verifiable. I have sought to show that it is not only verifiable but verified, and in what way. I offer this as a scientist's contribution to theology—if you will, a clearing of some scientific underbrush that has hindered theology's advance.

A New Interpretation of Original Sin: Major Points

- The only compelling theological reason to postulate a literal Adam was in order to account for the universality of sin—because, given their conception of the universe as static, Christians had no other way to account for it.
- The selfish human acts that we call sinful do share a genealogical unity (the common origin of all life), but their sinfulness arises from a development that is logically and temporally separate from their common genealogical origin, and much more recent. This explicit logical differentiation—the radical historical decoupling of the source of original sin's universality (the common origin of life) from the source of its moral character (human free will)—is the key to the problem.
- Here, consistent with the Christian tradition, original sin is identified with some definite trait that is passed on by "propagation" or "generation" as part of our human nature, and not merely by imitation: evolutionary selfishness.
- Evolutionary selfishness is a necessary and sufficient explanation of the sinful social structures on which the "cultural-transmission" school of theological thought blames our individual sinfulness.
- It clarifies things, and removes some difficulties, to speak of original "sin" as *original selfishness*.
- There was no "Fall" of humanity from a prior state of perfection. God could not have considered the sins of the first humans more momentous than those of any subsequent people. Rather, God knew that humanity, like children, would need moral training to transcend what selfish evolution could do for them.
- God invites us to help in building the Kingdom of God, and has given us the example of Jesus to help us cope with the tension between our selfish nature and our call to altruistic love.

- The world as it came from the hand of the Creator was both good and "fallen" at the same time: imperfect, but perfectible through grace.
- The ultimate horror we face is not suffering or death, but futility: the lack of purpose. But God promises that once God's Reign is established, the creation will no longer remember its pain.
- God's decision to create a material world could only be a decision to create breakable (and ultimately broken) things. The physical "evil" of animal suffering is inseparable in principle from even a good creation, just as the real (moral) evil of sin is inseparable from a creation in which intelligent creatures have free will.
- Banishing evil from an autonomous world would involve a contradiction, and is therefore impossible, even for God; whereas a non-autonomous world, even one without evil, would not be worth creating.
- There is thus a continuity, a connection, between the simple breakability of physical things on the one hand, and our own intelligence and free will on the other.
- If you start with low expectations of matter, and with the assumption that spirit, especially God's Spirit, can overcome any limitation of mere matter, then all options seem open, even the pristine perfection of Eden. But the powers and limitations of matter must be taken seriously, even by God.

A New Interpretation of Original Sin: Discussion Questions

- Does it make sense to you to think of the creation as having come from the hands of the Creator both "very good" and containing the seeds of physical and moral evil? Why or why not?
- Does it make more sense to you, or less sense, to think of "the Garden of Eden" as just a synonym for "the Kingdom of God," and as really coming into existence in the present and future, rather than as having existed once in the remote past?
- Is it a good enough explanation of our sinfulness to say that we are each born into a sinful society and molded by it, or do you think the roots of our sinfulness lie deeper than that?
- Do you think that Christian doctrines such as the Creation, the Trinity, the Incarnation, and salvation by Christ make more sense in the light of evolution, or less sense?
- Do you think suffering is good for us? If so, do you think God makes us suffer for that reason?



Rainbow and Lightning

Appendix: Answers to Objections to the Darwinian View of Nature

by Daryl P. Domning

To many people, the beautifully simple mechanism of Darwinian natural selection seems too simple and anything but beautiful. A long list of objections to this account of how evolution works is regularly raised by those who find the idea profoundly disturbing. Among these common objections are the following.¹⁸

1. Chance alone could not possibly account for the complexity of life.

Correct: it doesn't. As explained above, chance is only one component of the process. The dominant component, and the one that generates adaptive complexity, is natural selection, which, though it is unconscious and impersonal, is the very opposite of random or chance. It is therefore completely mistaken to characterize Darwinian evolution as essentially random, or to describe its products as simply the results of chance.

One version of this objection is couched in terms of information theory. In order to explain where the (genetic) information embodied in living things could have come from, contemporary "intelligent design" theorists envision an intelligent Designer who micromanages creation on the level of individual organisms and molecules. But for an accurate understanding of where genetic information comes from, we must specify what this information is *about*. The information any organism needs for survival (including the genetic information that generates the organism itself) is, at bottom, information about *what works* in the immediate environment in which the organism has to survive, and the most authoritative source of information on this subject is the environment itself.

Is evolution "just chance"?

Mutations occur at random (not under the micromanagement of an intelligent designer), and are then tested against the demands of the actual environment, which then reveals which ones are useful and which are not. The ones that survive the test, and that come to characterize the (now-altered) population, therefore reflect, and embody information about, the environment that selected them for survival.

The environment thus acts as a template against which natural selection "presses" the genetic makeup of the populations that inhabit it. Their gene pools thereby automatically have "impressed" on them the very information most relevant to their continued survival—not by chance, nor by an "intelligent Designer," but simply because in the natural order of things this could not be avoided. Together with the occasional favorable mutations, this simple, direct, reliable, nonrandom process of natural selection, continued over countless generations, has gradually raised the complexity of living things to the levels we now observe.

Thus random mutations by themselves do not "create information," any more than a monkey with a typewriter creates a Shakespearean sonnet. Information cannot usefully be said to exist in the genetic code until after selection has acted. It is only the exposure of mutational "raw material" to the test of survival in the environment that carves this random input into new "information" (which, remember, is *about* nothing other than survival in that very environment, and is thus a "report" from the field to future generations about what actually worked).

The point is that random factors in the evolutionary process do not render the whole process random in a destructive sense. Chance has a role to play, but not the dominant role. Randomness is not incompatible with laws of nature; on the contrary, it is an important (maybe the only) source of novelty. Even entropy—the universal tendency to disorder manifested in genetic mutations—can thus be harnessed by selection to create opportunities for new and greater forms of order.

When people object to the supposed role of "chance" in evolution, they may really be uncomfortable with a different attribute of nature: autonomy, the world's ability to operate and evolve on "automatic pilot," governed only by its own laws. Even if this process is acknowledged not to be purely the result of chance, it is still hard for many to believe that "mere" inanimate matter and impersonal natural forces could accomplish such a thing without supernatural micromanagement. As discussed below under objection #11, the roots of this skepticism are not biblical or Christian, but pagan and Gnostic.

2. Natural selection is tautological: those who survive are said to be "the fit," but "the fit" are defined as precisely those who survive!

This misconception arose from the methodology of experimental geneticists early in the twentieth century. They were not seeking to test the logical basis of Darwinism, but rather assuming the reality of natural selection and merely seeking to measure its power in the laboratory. They assumed that survival reflected fitness, and used observed survival as an empirical measure of, or proxy for, fitness. They introduced terms like "Darwinian fitness" (representation of one's genes in the next generation). In reality, true fitness (competitive ability) is the result of "good engineering" of the organism (however difficult this may be to measure in practice). *Those who survive are the competitively able, and the competitively able are the well-engineered: there is no logical circularity.*

3. Natural selection is purely a negative force: it only removes less-fit individuals and gene combinations from the population, so it cannot create anything genuinely new.

But even a negative process can still be creative. Michelangelo carved his "Pietà" by merely removing pieces from a block of marble, yet his creativity is not questioned. Precisely because evolution is change in a population (an interbreeding group), rather than change in an individual, it can result in novel populations with different genetic character. What changes under the influence of selection is the overall genetic makeup of the population—the relative frequencies of different gene combinations in the population.

Together with the constant input of wholly new variations from mutation, the selective removal of variations from the gene pool over long periods of time can bring about almost unlimited change. *The Darwinian process is therefore less like marble sculpture than like clay sculpture: that which is being "carved" or shaped (the gene pool) is not static or fixed in stone, but endlessly changeable, malleable, and constantly being added to and subtracted from.*

4. Favorable mutations are too rare to provide sufficient raw material for the evolution we observe.

Although mutations are the ultimate source of the variation on which selection acts, the immediate source is usually recombination, which can at any moment newly (and repeatedly) expose to selection a mutation that actually occurred many generations before. Indeed, it should normally be the case that a favorable mutation becomes available not just in the nick of time, when an organism's need for it is acute, but during a period when the organism is quite adequately adapted to its surroundings, and the novelty merely improves its functioning in some way, over and above the minimal demands of survival.

Moreover, when a mutation is first exposed to selection, it may be selectively neutral (hence not eliminated), and only become favorable when circumstances change—due to environmental change, or to recombination placing the mutation in a different genetic context. Therefore the "window" of time within which an ultimately favorable mutation has to occur before it is needed may actually be quite generous.

5. Mere change of gene frequencies within species ("microevolution") is not sufficient to account for evolution of new species or higher categories ("macroevolution").

Darwin himself based his explanation of macroevolution on an admittedly conjectural extrapolation from microevolution. However, no evidence discovered since gives serious reason to doubt the validity of this extrapolation. And although the fossil record at first gave him little direct support, fossil documentation of macroevolution is now so routinely reported in the scientific literature (and so little remarked upon even there) that it seldom attracts any attention from the popular press.

This distinction between micro- and macroevolution, however, is problematical: it has actually been observed only in the writings of evolutionists and their critics, and never "out there" in nature. It is a distinction *hypothesized* by people with an axe to grind, either theoreticians postulating different mechanisms for these two supposed modes of evolution, or creationists denying the existence of macroevolution altogether. Not all biologists agree that the distinction is worthwhile.

Revealingly, the distinction is often made according to a sliding taxonomic scale—

particularly by creationists, when they speak of the supposed "created kinds" within (but not between) which they are willing to concede some amount of (micro)evolution. When creationists talk about humans and what evolutionists view as their closest relatives, the "created kind" is always a species or (at most) a genus. But on branches of life's family tree more distant from us, the "created kind" is typically a group that taxonomists rank as a family, order, class, phylum, or even kingdom.

This semantic dodge (which exploits the average layman's fuzzy notions of biological classification) conveniently allows the creationist to claim, when confronted by evidence of macroevolution within such a major group (i.e., *between* slightly *less* major subgroups), that "the bacterium is still a bacterium," "the worm is still a worm," "the fish is still a fish," "the horse is still a horse," etc. They thereby gloss over the tremendous differences among different kinds of bacteria, worms, fish, or horses. But heaven forbid the conclusion (which the same reasoning would require) that we are still apes!

A more sophisticated version of this objection, based on the metaphysics of Aristotle and the Scholastics,* holds that different "kinds" of creatures have different, unchanging "essences." Hence, evolutionary transitions between these "kinds," if they occur at all, are *by definition* beyond the power of merely natural forces, and require divine intervention in order to cross the otherwise-insuperable thresholds separating the "kinds." As a result, God is periodically obliged to act in nature (as a "secondary cause," not just as a "prime mover" or ground of being) to keep evolution moving and on the desired course—above all at the origin of life, and at human emergence from non-human ancestors.

The trouble with all this is that Darwinism has done away with unchanging biological "essences," and instead sees the species as a segment of a continuum. It is a population of potentially interbreeding individuals, varying among themselves in many traits, and grading backwards and forwards in time into more or less different ancestral and descendant populations, while remaining delimited from contemporary species. Species that are related as ancestor and descendant are thus not like discrete beads on a string, but like successive sections of a twig on a branching bush: the "boundary" between one section of a twig and the next section of the same twig is arbitrarily drawn by humans, like political boundaries on the Earth.

With this background, we can better tackle the (obviously loaded) question of micro-versus macroevolution. Can "microevolutionary" processes alone (mutation and selection) really produce major changes like those seen in the fossil record? Yes; they are known to be more than fast enough to do so (by up to seven orders of magnitude!), because the "macro" changes are actually slow compared to the evolutionary "action" on the ecological time scale. Microevolution tracks short-term ecological changes, which are often reversed within a few years or centuries. In contrast, the fossil record usually filters out such rapid zigzags and only displays patterns of net change averaged over tens of thousands to millions of years. In sum, the rate of observed macroevolution reflects the (generally slow) rate of long-term net change in the environment, not some inherent limit to the power of selection itself.

Natural selection only aims at, and can only produce, short-term adaptation to immediate needs. If those needs never changed, selection would quickly achieve the best adaptations readily attainable, and evolution would largely cease. (This is the case with so-called "living fossils," organisms lucky enough to have found ecological

niches that have remained relatively stable for millions of years.) But the target is often a moving one: many environments change over the long haul. As a result, there is no end to the task of adapting, and no limit (at the imaginary "species boundary" or any other boundary) to the change that selection can eventually bring about.

Biologists continue to debate whether ordinary natural selection among individuals suffices to explain all of macroevolution, or whether any special mechanisms, such as selection among different species, are involved in evolution above the species level. However, the latter view bears the burden of proof. And given the evidence that ordinary selection can produce change far faster than needed to explain macroevolution, additional mechanisms seem superfluous. A conservative view of the issue would be that, just as inches add up to miles, so-called micro- and macroevolution form a continuum, and it is artificial and misleading to draw a sharp distinction between them.

Sometimes particular differences between taxonomic groups have seemed to require qualitative "leaps" in genetic organization beyond the scope of ordinary mutations (and therefore beyond the scope of selection). However, it is not proven that such "leaps" are ever really necessary, and the examples that have been proposed (such as the evolution of the eye) have typically been shown to be explainable by small intermediate steps well within the power of mutation and selection.

In many cases, the crucial steps are not "forward" but "sideways," when something adapted to one function takes on an additional, quite different role (and then perhaps loses the original function)—as when reptilian jaw bones became additionally involved in sound transmission and then turned into mammalian ear bones. There are probably few if any truly complex adaptations in which this basic pattern of innovation via change of function has not played a part.

Some have argued for intangible vitalistic or finalistic forces in evolution; or some direct divine intervention or "intelligent design" guiding evolution on desired paths or creating adaptations of allegedly "irreducible complexity"; or inheritance of adaptive characteristics acquired during an organism's lifetime. But advocates for all these ideas still bear the burden of proof. Since our understanding of the genetic code is still in its infancy, it may turn out that there are more efficient though still purely natural ways of bringing about complex adaptations in addition to classical Darwinian selection.

A theory of evolution must explain not just change, but adaptive change.

New mechanisms of heredity and gene function continue to be discovered, and some of these do involve ways for the genetic code to be heritably modified apart from classical mutations. But none of these mechanisms has so far been demonstrated to reliably and consistently produce *adaptive* changes to the code, and that has always been the critical point. At this writing, natural selection still remains the only proven sculptor of organic adaptation. All other known mechanisms of genetic change appear to be at least partly random with respect to the organism's needs, and therefore function as "mutations" in the broadest sense.

6. Has macroevolution ever actually been observed, in the fossil record or elsewhere?

Here again there are biases built into the question. The premise attributed to evolutionists is that if (a) a species living at time 1 is ancestral to one living at time 2, and if (b) we were to watch carefully during the entire period from time 1 to time 2, then at some point we would see something dramatic happen: macroevolution!

But failure to see something dramatic ("to see a new species evolve today") is in fact not a valid test of Darwinian theory, which has quite different, non-essentialist premises. We no more expect to see something "happen" when one species "turns into" another than we expect to find a waterfall at every point where a river crosses a state line. We humans draw these artificial lines separating ancestral and descendant species, and we do it only in hindsight, after we notice that enough change has accumulated to warrant recognition of a new species.

This does not mean we can never catch macroevolution in the act. Even apart from phenomena such as polyploidy in plants (which allows new species to arise in a single generation), we can identify cases where large numbers of new species have evolved in the (relatively) recent past, and most likely are still evolving today (though without any dramatic discontinuities being visible to us). These include hundreds of species of cichlid fishes found only in certain East African lakes. These "species swarms" have demonstrably evolved within the last few thousand years, because the lakes in question did not exist earlier. The kind of reproductive isolation that separates these species can be produced by natural selection within as little as a dozen or so generations.

As pointed out by paleontologists who favor the "punctuated equilibrium" hypothesis, rates of evolution vary widely. Long periods during which little or no net change in a species occurs (presumably because there is little or no net environmental change to disturb its adaptive "equilibrium") may be "punctuated" by much shorter periods of relatively "rapid" change. But this change is "rapid" only to a paleontologist—i.e., it is too quick to be observed in the coarse-grained fossil record. If viewed on an ecological time scale (such as the scale of a human lifetime) rather than a geological time scale, the rate of change during one of these "punctuations" would still seem very slow (and probably well within the capability of natural selection), with no dramatic, "macroevolutionary" breaks that would catch our attention. For this reason, the idea of "punctuated equilibrium" is in no way inconsistent with neo-Darwinism.

Most conclusively, countless instances of macro- ***Has evolution ever been observed?***
evolution are clearly documented in the fossil record,
despite the creationists' impassioned denials. The remaining "gaps" between genera,
families, orders, classes, and other higher groups of living things are steadily being
filled in by fossil finds every day. Former gaps between entire vertebrate classes, such as bony fish and amphibians, reptiles and birds, and (especially) reptiles and mammals have become so crowded with diverse intermediate fossils that the difficulty now often lies in picking out the true ancestors of the modern groups among all the collateral fossil lineages that are candidates for the honor. In particular, the evolution of humans is increasingly well documented (Tattersall 1993, 1995; Tattersall and Schwartz 2000; Campbell and Loy 1996; Klein 1999; Lewin 1998; also the Institute of Human Origins Web site at <http://www.becominghuman.org>).

Many connections among animal groups may never be demonstrable by fossils, because the connecting "links" were never fossilized (though the connections may be

traceable by analysis of their modern relatives' DNA.) But more than enough fossil examples of macroevolution have already been found to dispose of the canard that evolution beyond the supposed "boundaries of the species" never occurs. Of course creationists cannot afford to concede this, but refusal to acknowledge the obvious continuity between species has no more sense to it than arguing that the footprints forming a single trail through the snow were each made by a different creature, because there are gaps between the footprints!

7. Regardless of what sorts of evolution we may observe happening today, we are still not entitled to state as fact what happened in the distant past, when no one (or no one but God) was around to witness it.

If this argument were logically valid, we would have to make some pretty radical changes in our legal system, which routinely sends convicts to prison, or even death, in the absence of eyewitness evidence. Physical evidence, in the form of fingerprints, DNA, autopsies, ballistics, and many other kinds of scientific data, is rightly considered sufficient in principle to meet the legal standard of proof "beyond a reasonable doubt," even regarding events for which no human witnesses are available. Similarly, skilled hunters, like Indian scouts in the old West, can often tell from animal tracks and other signs what sort of creature passed a spot and how long ago—and then prove it by tracking down the creature itself. And any of us can walk into our own homes and in a single glance, with all the certainty we need, tell something from the changes since our last visit about what our family members or pets have been doing there. It doesn't take a Sherlock Holmes, let alone divine revelation, to see into the past. A mere understanding of the ordinary processes and behavior of nature and society is sufficient.

Natural science is no different. Although the "historical" sciences like geology and paleontology rely much less on human manipulations of nature (hence much less on eyewitnessing events) than the so-called "experimental" sciences like physics, chemistry, and much of biology, their conclusions are no less certain. The reason is that *there was a witness to the distant past, as far back as the Big Bang itself, other than God. And unlike God, that witness can be hauled into court to testify. That witness is the physical universe itself*, which has from the first moments of its existence been recording its own history in its own ever-changing form and substance. Countless "experiments" have already been done, by nature itself, and scientists have only to observe the results. *God was not the only witness to creation.*

The record is not complete, of course. But it is more than complete enough for us to figure out the essentials, including not only the fact of evolution in general but many of its details as well, and to establish them as proven beyond reasonable doubt.

Fundamentalists also assert that as a result of Adam's Fall, human intellects have become so "darkened" that we can't trust them to figure out much of anything, so we have to rely on divine revelation even about natural things (certainly including the possibility of evolution). But this objection is never raised except in regard to the study of our origins. How odd that geologists seek oil and gas miles underground, and reliably find enough of it to keep their companies in business—but they can't calculate the age of Earth and not be off by a factor of a million. How odd that biologists profitably breed plants and animals and even create a whole industry of genetic engineering—yet when it comes to how evolution might work, they don't know what they are talking about. How odd that every day, humans manage all sorts

of complex tasks like repairing cars, programming computers, launching moon rockets, doing brain surgery, winning lawsuits, and even preparing their own income tax returns—and somehow the "darkening" of their intellects precludes none of this. Only when we turn to the study of evolution, it seems, do the shades come down on our brainpower.

The sciences that reveal our evolutionary origins are no more beyond the average person's understanding than any of these other achievements. They all require study and effort to master, but the methods are open to public inspection, and the methods work.

8. Stressing the "selfish" qualities of living things ignores the abundant evidence of cooperative, even altruistic behavior in nature.

This is a crucial point, as understood clearly by Darwin himself, who stated in *The Origin of Species* (1859): "If it could be proved that any part of the structure [or, by implication, the behavior] of any one species had been formed for the exclusive good of another species, it would annihilate my theory, for such could not have been produced through natural selection." So far, no such case has been found. Destructive exploitation of one species by another, via predation or parasitism, is ubiquitous, and almost equally so are cases where the interaction benefits one species while leaving the other unaffected (commensalism) and cases where both species benefit (symbiosis or mutualism). *But wherever a trait of an organism benefits another species, it is found also to be somehow of use to its possessor.*

Many instances of cooperation among members of the same species are explained by kin selection: they involve close relatives, and, as noted above, one's close relatives carry many genes identical to one's own. Therefore, promoting the reproduction of close kin perpetuates copies of some of one's own genes as well.

Other cases of cooperation can be explained by reciprocal altruism: I'll scratch your back because you scratched mine yesterday and may do so again tomorrow, even if we are unrelated. This too is obviously motivated by self-interest.

Computer simulations and experiments in game theory show that cooperation can be a highly adaptive strategy even in a strictly Darwinian environment. In other words, natural selection can promote cooperativeness as well as competitiveness, and the latter can even take the form of the former. As evolution has advanced, cooperation has in some cases increased in importance relative to the cruder forms of competition. A special and highly refined form of cooperation that occurs in the higher primates (monkeys, apes, and humans) is reconciliation behavior: limiting the escalation of arguments, and making up afterward. Frans de Waal, who pioneered the study of peacemaking in our primate relatives, emphasizes that individual self-interest ultimately motivates even this: "The goal of conflict settlement is not peace per se; it is the maintenance of relationships of proven value" (de Waal 1989, 231).

Cooperation: A good way to compete.

In short, the origins of cooperation and apparent altruism seem explainable in terms of selfishness, but *no one has managed* (or, so far as I know, even tried) *to explain the origins of selfishness in terms of altruism or cooperation. Evolution most likely followed the same course as our individual development: we each started out in life totally self-centered, and only later learned to work and play well with others.*

Selfishness would thus appear to be the more primitive and fundamental condition, with altruism (if it arises at all) as its later-appearing derivative.

9. How could a process as wasteful and cruel as Darwinian evolution be part of a "good" plan of creation?

I think the answer hinges on what we mean by "wasteful." Central to our idea of waste is the notion of purpose: something is wasted only when it fails to fulfill its reason for being. Spilled milk is regretted because it was supposed to have been drunk. But central in turn to this notion of purpose is our own egocentricity: we humans see the spilled milk as wasted, but the cat that laps it up sees it differently. Purpose and its accomplishment are very much in the eye of the beholder.

In the largest view—the view of the planet's biosphere as a whole—there is no such thing as waste. Everything is somehow recycled. If a biological process has a "waste" product, some organism is likely to evolve the ability to use it as a resource. Even residues that go unused by life return to the supporting Earth itself, as fossils (or even fossil fuels!).

Isn't evolution wasteful and cruel?

Even the supposedly inescapable Second Law of Thermodynamics gives back something to the cycle of life—and something indispensable. *The universal energetic inefficiency called entropy, which constantly tends to drag ordered systems toward disorder, shows up in the inevitable errors that occur in the copying of DNA. But without these mutations to serve as grist for selection, life could not evolve. The circle is complete: the law responsible for the ultimate "wasting" of the universe, the entropic loss of heat that on the grandest scale destines the physical cosmos to a cold, dark future, at the same time stokes the fires of life with ever-new variety and promise.*

Each individual and species, no matter how it participates in the cycles of life, helps to keep those very cycles, and hence the creative process of evolution, going. If we believe in a unitary act of creation, or even in a single Creator, then the purpose that really counts, in the eyes of the Creator, is the overall purpose of the biosphere as a whole and of its ongoing cycles—whatever that purpose may be. What we see as "waste"—because it does not seem to advance our own agendas—the Creator may even regard as exuberance and fecundity, and as a worthy end in itself.

In this light it is hard to see how Darwinian evolution, an inevitable result of those natural cycles, can properly be called "wasteful," if nothing in fact is being wasted. It is equally hard to see what alternative could be more efficient. A similar response can be given to the charge that evolution is "cruel." If this means merely that it involves suffering, this is certainly true. But it seems impossible to imagine life governed by known physical laws yet without suffering and death. "Cruelty," however, connotes the infliction of suffering for no good reason. The relevant question then becomes: *Are the results of evolution worth the suffering it necessarily entails? To which I reply: Does a mother consider her child to be worth what she suffers to bring it into the world?*

But would an efficient Creator need *billions* of years of such suffering and death to accomplish his or her purpose? Our impulse is to answer "No." But, if we are honest, do we really know enough about the business of creating worlds to say how long it should take? If creation is the self-communication of an infinite God to a finite world, as some theologians say, how quickly *could* it be accomplished?

When someone objects that Darwinian evolution is cruel and wasteful we must ask: Compared to what? No one has ever suggested another practical way of making a functioning, coherent material universe. Even the short-cut of special creation would produce only a patchwork of genealogically unrelated pieces that were fundamentally alien to each other. And if God's intention was to have that universe bring forth a magnificent diversity of interrelated forms of life, including intelligent beings capable of love and able to enjoy into eternity a personal relationship with their Creator, then it is surely possible to argue that the result is worth the cost, and the wait.

10. The Darwinian idea of "survival of the fittest" provides too ready a justification for the elimination of human individuals or groups who are deemed inferior, due to physical or mental handicaps, ethnic prejudice, or other reasons, and it is incompatible with Christians' belief in the dignity and unconditional worth of each person.

It is true that Darwinism has been used in this way, for example by the Nazis, to excuse some of the worst atrocities in history. But is this Darwin's fault, or have these criminals misapplied his ideas? There is a logical chasm between the descriptive statement that life up to now has evolved through natural selection, and the prescriptive or normative statement that humans should consciously attempt to control their own evolution according to the same principles, through artificial selection. The way selection works in nature does not mean that we should shed no tears if poor or marginalized people somehow fall by the evolutionary wayside.

While some have seen evolution as flatly opposed to morality—or have found in evolution no relevance to morality at all—many others have considered our morality to be itself a product of evolution, even a sign of evolutionary progress. Some of these people (including "Social Darwinists"), in their zeal to harvest fruits from evolutionary science for the supposed benefit of humanity, have been too eager to make this illogical leap to deriving their morals from biology itself. Most attempts to construct systems of "evolutionary ethics," however, have been unsatisfactory, suffering from the "naturalistic fallacy" that "is" implies "ought to be." By this reasoning, if "the survival of the fittest" has governed all past and present evolution, then it is the only proper principle by which to steer our own future course.

But is this a valid extrapolation? Human evolution is now mainly cultural, and the laws of ordinary natural selection arguably no longer apply, but it is not clear from science alone what other laws we should obey. Some versions of evolutionary ethics have been made to yield humane dicta that are at least consistent with those of traditional religions, but other systems endorse ruthless elimination of the "unfit." Which ethical inferences from evolutionary biology are correct?

Of course, other data besides those of biology are arguably relevant, including the teachings of revealed religion. *"Survival of the fittest": The pattern of the past, not a rule for our future.* There is more to human existence than biology, and therefore no reason to rely on biology alone to inform our ethics. We cannot reduce our complex social and conceptual worlds to biology, and in seeking ethics to govern these worlds, we should not look for them where they are not to be found. Darwinian theory is best viewed as morally neutral, though it can shed valuable light on human behavior and provide a useful background to discussions of morality (Wright 1994b; Pope 1994). In particular, by exposing the role of selfishness in our evolution, it

provides a powerful antidote to that very selfishness.

As enlightened evolutionists, therefore, we should seek our ethics elsewhere than in Darwinian selection. In particular, those of us who are also Christians are to follow the very different road revealed to us through the incarnation of Christ, and along this road it is never permissible to leave our unwanted by the wayside as "evolutionary waste."

11. The claim that humans descend from mere animals is an affront to human dignity.

Several criticisms can be leveled against this attitude. First, it's certainly out of step with our American history and culture. The idea that we should look to our ancestry for our sense of worth was one that we Americans decisively abandoned when we turned our backs on the hereditary aristocracies of Europe. Furthermore, the assertion can be turned on its head: if the animals were capable of giving rise to us, after all, surely that enhances their dignity!

Nonetheless, some still argue that there is a theological problem here, because we take such pride in bearing the "image and likeness" of God. But if Jesus has revealed to us a humble God, can we image that God by being prideful? The trinitarian God, as theologian John Haught (2001) points out, is distinct from the world not by being unrelated to it, but by being the most intimately related Being of all. Hence, to display the likeness of God—the capacity for intense relationship—we should embrace our relationship to the rest of life on Earth.

But if human dignity depends on the uniqueness of our rationality (or of our creation in God's image), and if Darwinism demonstrates continuity between humans and other animals, then doesn't Darwinism diminish our uniqueness, and therefore our dignity?

Even if they were not the result of evolution, the similarities between other species and our own—for example, in behavior and psychology—are incontrovertible facts. Indeed, no scientific discoveries of the last half-century have shed more light on human nature and its origins than these. Great apes (orangutans, gorillas, bonobos, and chimpanzees) have highly individual personalities, rich emotional lives, and complex social relationships. They can learn systems of symbolic communication (such as American Sign Language). And they display empathy, conciliation, and love, as well as surprisingly sophisticated political intrigue, deceit, and aggression. Some ape species even possess distinct behavioral and material cultures in different geographic regions. We have grossly underestimated them in the past; and while their intellects and cultures are certainly inferior to our own, we do not yet know just how different or alike they and we really are.

*Are we made in the
"image of God"?*

Darwinian theory is opposed to the "essentialist" view, harking back to Plato and reflected in modern creationism, that different species have fundamentally different, eternally separate and unvarying "essences." Living species instead consist of populations of unique individuals that vary in countless ways, and this variability is the raw material of evolution. In this sense, Darwinism emphasizes the importance of individual differences in contrast to species differences, and challenges the idea that humans are in a special moral category. At the same time, of course, this stress on individual uniqueness potentially enhances the dignity of individual humans, as

distinct from humanity as a whole.

Moreover, a property such as "rationality" (or "intelligence") is made up of many distinct traits and abilities, all of which vary among human individuals and are shared to various degrees with nonhuman animals. Each of these traits must have come to characterize the human population by a gradual process, making the "animal-human" boundary irreducibly fuzzy.

But a difference in degree can also become a difference in kind. We recognize so-called "emergent" properties in all sorts of processes and systems, both living and nonliving. Simple rises in temperature change ice into water into steam. A tadpole transforms itself imperceptibly into a frog. A caterpillar becomes a butterfly. The invention of computers has shown that a certain level of "mere" physical complexity can yield "intellectual" abilities (such as solving math problems or playing chess) equaling or exceeding our own.

Does evolutionary continuity mean there is no boundary between our species and others?

If evolution gave rise to moral agents, a distinction between morally reflective and morally nonreflective beings would still be no more problematic than the task of distinguishing degrees of moral responsibility among defendants in our courts of law, when questions of immaturity, insanity, or mental impairment are raised. As for our extinct, "subhuman" ancestors at the evolutionary boundary between nonhuman and human, as a practical matter we are not called upon to judge their actions.

The extinction of the intermediate forms that once connected our species to others has left a clear boundary between human and nonhuman abilities today, making us unique in that sense. If one allows that our dignity as a species can be a matter of degree as well as kind, then we can still retain our moral stature and responsibilities while acknowledging the dignity of our fellow creatures and our commonality of descent with them.

Although Darwinism in one sense regards humans as a species like any other, it also emphasizes the differences among species that arise out of the variations among individuals. The differences, especially in our case, are as obvious and important as the similarities, and Darwinism helps explain how those differences came about. If Darwinism does not assert for our species a special dignity, it is because "dignity" itself is not part of the lexicon of science; but we need not look to science alone to provide our sense of dignity, any more than our sense of ethics.

The hostility to tracing our descent from other animals is fundamentally un-Christian, in fact heretical. It owes much to the often-condemned heresy of Gnosticism, which sees the material as inferior or evil and only the spiritual as good. When we disavow any genealogical relationship to "mere animals," we are implicitly denying that we (we spiritual beings!) are really part of God's material creation. This idea of the Gnostics (that the human body is alien to the human personality or soul) can be traced back to Plato and the Neoplatonics, who had great influence on early Christian thought. Like that other Platonic notion, essentialism, this one is also opposed to Darwinism—and to the orthodox, incarnational Christian faith. It is supremely ironic that such a dualistic, unbiblical stance should be taken by biblical literalists who insist on the importance to Christianity of the Genesis creation account—which unequivocally affirms that we were formed "out of the clay of the ground" (Genesis 2:7).

Ultimately, of course, whenever we allow ourselves concern over affronts to our dignity, we are flirting with the sin of pride. But this is a moral issue on which evolution is neutral. Biblical literalists feel that descent from "mere animals" diminishes our dignity; but the implications of evolution really cut both ways. For which is more flattering to my ego: to think that in making my species the Creator spent only an instant (or six days at best), or to think that God was willing to devote *over thirteen billion years* to the task of bringing *me* into existence?

12. Why couldn't the human race have descended from a single couple? Doesn't genetic evidence support this?

Biologically, a human population of the present size might have descended from a single couple (a concept called monogenism). Evolution, however, normally takes place in a breeding population much larger than two, and there is no reason to think that humans were an exception. Even if our ancestry could be traced to a single pair, they would certainly have belonged to a population from which they did not outwardly differ. On the whole, monogenism finds no positive support in biology or paleontology, and it has long seemed less than probable *a priori*.*

Molecular genetics, however, now makes possible a much stronger statement: *while a hypothetical human population of the present size might have descended from a single pair, the particular population that now exists could not have*. It includes far more genetic variety (much of it inherited from prehuman ancestors) than could possibly have been transmitted to us by way of a single human couple. As calculated by geneticist F. J. Ayala (1995), the minimum possible number of individuals in the *breeding* population at any time in our history was at least 4,000, which would probably correspond to a *total* population of some 15,000 to 20,000 actual individuals. Hence, a bottleneck population as small as two people was clearly a mathematical impossibility.

What, then, of the studies showing that all people living today have in common a single female ancestor? In fact, this evidence does not mean that this so-called "mitochondrial Eve" was either the first human female, the only one living in her time, or the mother of all humans who lived after her. Rather, as Ayala explains, we all share such an ancestor merely because, by chance, none of her female contemporaries happened to leave descendants today in the strictly maternal line. The idea of a single pair of people as the sole parents of the whole human race is not scientifically tenable.

Did Adam and Eve really exist?

13. If our brains are merely the evolutionary products of blind natural processes, how can we trust our own thinking, in science, morality, or anything else? In particular, what if our religions themselves are no more than useful adaptations to our environments, and have no objective truth value?

Truth, in the sense of how the world around us really is, is the ultimate criterion of evolutionary advantage, and not vice versa. It is illogical to think, just because some perception has evolved because it has survival value, that it is delusory. Just because we have evolved to perceive light does not mean that light itself is a delusion. Rather, in natural selection the condition of the organism is constantly referred back to and tested by the demands of the environment. The organism (via the mutation or genetic variant) proposes, the environment (via natural selection) disposes. In the

long run, selective advantage lies in conforming to the demands of objective reality, not in creating subjective illusions.

Of course our nervous systems and sense organs can generate systematic errors, such as optical illusions. But the fact that we can recognize and correct such errors shows that our basic cerebral equipment, used with due care, can be trusted. The truth value of our more complex belief systems is difficult to determine for reasons intrinsic to the belief systems themselves, not because evolution has wired the circuits of our brains to give deceptive results.

Ironically, it is antievolutionists who are more vulnerable to mistrust of their own intelligence. Fundamentalists continue to hold the doctrine (noted under objection #7 above) that our minds are so clouded by the effects of Adam's sin that human reason (e.g., in the form of evolutionary science) cannot be trusted, and so we must seek aid in a literal reading of the Bible to gain correct knowledge of worldly reality. But this doctrine itself is an example of human reasoning, and consequently it undermines its own credibility, leading to a logical dead end. Evolutionists, in contrast, have a firm basis for trusting their own thought processes and (if they are so inclined) for appreciating them as part of the Creator's handiwork.

But biologists today have good evidence that natural selection has molded us to behave in certain ways—altruistically, for instance—while remaining unconscious that our "true" motives are evolutionarily-selfish ones. Sometimes it may even be advised to think our motives are exactly the opposite of the selective forces that really drive us. Therefore, the objectivity of our thoughts is highly suspect. So (says the skeptic) how can we believe any longer in so-called "free will," or the moral responsibility it implies? Indeed we often deceive ourselves, especially in imagining ourselves to be better than we really are. This tendency is doubtless a product of our evolution, and very likely it has some selective value. But beyond this point the skeptic's argument also undermines itself.

Everyone agrees that we seem to have free will. But if this is an illusion, then my innermost mental processes are untrustworthy; even when I examine my own thoughts, divorced from any sense impressions from the outside, I cannot rely on my perceptions. Even less, then, can I rely on my thought processes when they operate on sensory data. Therefore I cannot hope to know what is really going on outside my head, any more than inside it. So empirical science is impossible. But it was empirical science that discovered evolution and generated the evidence for selection-molded self-deception! Hence, whatever deceptions about myself evolution may have programmed into my brain (and they could be many and varied), science cannot, without destroying itself, go so far as to impugn mental functions on which our knowledge of the world depends.

Glossary

Actual sin. Sin committed by an individual person.

A priori. Deductive; based on reasoning from self-evident propositions, probability, or presumption.

Apoptosis. Genetically-programmed self-destruction of living cells.

Baltimore Catechism. A uniform Catholic catechism for the United States that was prepared under the mandate of a council of bishops held in Baltimore in 1884. It

served as the basis of Catholic catechetical programs and textbooks in the US until the 1960s.

Concupiscence. Disordered, inappropriate desire; the inclination to sin.

Council of Orange. Held by the Catholic Church in 529 AD, in reaction to the Pelagians' teaching that humans sin by imitating the sin of Adam.

Council of Trent. In 1545 the Council of Trent was set up by the Catholic Church to respond to the Reformers' accusation that Catholics took the Pelagian view that humans sin by imitating the sin of Adam. The Council published five canons pertaining to original sin to discredit the accusation.

Counter-Reformation. The 16th- and 17th-century Roman Catholic response to the Protestant Reformation. It was both a continuation of pre-Lutheran attempts at internal reform of the Church, and an attempt to meet the challenge of Protestantism.

Eschatological. Pertaining to the end of the world or the events associated with it in religious expectation.

Etiological. Pertaining to the causes or origins of things.

Evolution. Net change of gene frequencies in a population of living organisms over a long period of time.

Exegetes. Those who interpret scripture.

Fathers of the Early Church. Theologians of the early Christian centuries whose writings defended and developed the Church's teaching. They include such figures as Justin, Irenaeus, Basil, Gregory of Nazianzen, John Chrysostom, Athanasius, Jerome, and Augustine.

Galileo Galilei. (1564–1642) Italian astronomer and physicist; silenced by the Catholic Church for espousing the Copernican theory that the Earth orbits around the Sun.

Germ Cells. Cells that produce gametes which transmit genetic information during plant or animal reproduction.

Gnostic. System of religious thought during the early Christian centuries that sought salvation by obtaining secret knowledge that would help one's soul pass through the nine spheres between earth and heaven. It disregarded the importance of the body, leading to both harsh asceticism and sexual excesses.

Greek Fathers. Early Christian writers of the Church, 2nd to 6th century, who wrote primarily in Greek and who formed the basic theology of the Greek Church. Included among them are figures such as Ignatius of Antioch, Polycarp, Justin, Athenagoras, Clement of Alexandria, and Eusebius.

Hammurabi. King of Babylon (1728–1686 BCE?); promulgated a noteworthy code of law.

Hermeneutical. Referring to the rules for interpreting texts.

Homologous. Similar in structure or function because derived from a common source or ancestor.

Inclusive Fitness. An individual's total contribution of genes to future generations; the sum of its indirect fitness, due to reproduction by relatives made possible by its actions, and direct fitness, due to its own reproduction.

Instruction of Ptah-hotep. One of the earliest, ancient Egyptian compilations of wise sayings, attributed to Ptah-hotep, a vizier of the Fifth Dynasty (ca. 2450 BCE).

Justification. Right relationship with God wrought by God through Jesus Christ.

Kin Selection. Natural selection based on gains in indirect fitness (see Inclusive Fitness).

Manichaeism. An ascetic form of Gnosticism founded by Mani (216-277 AD) in Babylonia. At one time St. Augustine was a member of this sect.

Mutation. A sudden, heritable change in the genes or chromosomes of a living cell.

Natural Selection. A process by which the genetic variants (arising from mutation or recombination) in a population of organisms that are best adapted to their environment tend to survive.

Naturalism. The belief or assumption that observable phenomena result only from natural and not supernatural causes. Metaphysical naturalism is the philosophical assertion that this is actually the case; methodological naturalism is merely the working assumption (necessary to the conduct of the natural sciences) that all phenomena can be explained by natural causes, and hence that supernatural causes are not to be postulated for them in the course of scientific investigation.

Neo-Darwinian Synthesis. The synthesis (achieved in the first half of the 20th century) of Charles Darwin's theory of evolution by natural selection together with Gregor Mendel's theory of particulate genetic inheritance.

Original Sin. The need for salvation by Christ that is universal to all human beings and acquired through natural generation.

Parsimony. Economy in the use of a means to an end; in science, a criterion for selecting among alternative explanations based on minimizing the total amount of change or complexity.

Pelagians. Those who believe we can earn our eternal salvation by ourselves.

Phenotype. The visible characteristics of an organism, arising out of the interaction between genotype and environment during individual development.

Proto-Evangelium. Literally "the first Gospel"; Genesis 3:15 viewed as a promise of future salvation.

Reciprocal Altruism. The rendering of fitness benefits to another individual in

return for comparable benefits expected or already received.

Recombination. The formation, by crossing-over of chromosomes during meiosis, of new combinations of already-existing genes, resulting in new heritable characters or new combinations of such characters.

Reformation. The movement to reform the Catholic Church in the 16th century. It originally implied no intent to divide the Church; but condemnation of the Reformers by Rome and subsequent mutual recriminations eventually led to the separation of large parts of Western Christianity from communion with Rome and with each other.

Scholastics. Catholic theologians of the late Middle Ages, including such figures as Bonaventure and Thomas Aquinas.

Septuagint. Greek translation of the Hebrew Bible around 200 BC in Alexandria, Egypt.

Somatic. Pertaining to the body, especially as distinguished from the germ cells.

Synthetic Theory of Evolution. (see Neo-Darwinian Synthesis)

Teleological. Pertaining to design or purpose, especially in nature.

Theodicy. Defense of God's goodness and omnipotence in view of the existence of evil.

Tridentine. Pertaining to Trent, Italy, or the Roman Catholic Church council held there from 1545 to 1563 (see Council of Trent).

Yahwist. Term applied to the author of those parts of the Pentateuch (the first five books of the Bible) that refer to the God of Israel primarily as Yahweh, especially the stories in Genesis of Adam and Eve, Cain and Abel, the Flood, the Tower of Babel, and Abraham. He is presumed to have written sometime between 950 and 650 BC.

Yetzer Hara'. In Jewish rabbinical thought, the natural inclination of humans toward evil or selfishness; contrasted with a corresponding good inclination (yetzer hatov).



Golden Gene DNA

Notes

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- ¹ The terms "neo-Darwinism" and "synthetic theory of evolution" refer to the synthesis, achieved in the early twentieth century, between Darwin's concept of evolution by natural selection and the understanding of genetics gained by Gregor Mendel and others.
- ² For a list of recommended works on evolution see the "Resources" section.
- ³ The idea of natural selection was Charles Darwin's greatest intellectual contribution, and not the idea of evolution itself, which already had been discussed widely even before his time. However, the idea of evolution only became scientifically respectable after Darwin proposed a plausible mechanism—natural selection—to explain how it might operate.
- ⁴ Birkhead (2000) describes these often amazing strategies in detail.
- ⁵ All the Bible quotes are from the Catholic New American Bible.
- ⁶ Even proponents of the "strong anthropic principle," which holds that the physical constants of the universe were custom tailored to support human existence, would not argue that the universe's intrinsic congeniality to life spares living things the need to struggle for their existence.
- ⁷ His remarks have been translated from French into English and titled "Message to Pontifical Academy of Sciences on Evolution" (Pope John Paul II 1996, 114).
- ⁸ Qoheleth is the new name for the book of Ecclesiastes. "Ecclesiastes" is simply Latin for the Hebrew "Qoheleth." Both mean "church person," rather than being the name of an individual, but that is all the information we have.
- ⁹ Society of Jesus (Societatis Iesu) (Jesuits)
- ¹⁰ Double citations are included here for your convenience. There are a number of translations of the Greek texts. The ones given in Johannes Quasten's volumes are only one such translation. To check the accuracy of the translation, you need to know the name of the ancient document from which the citation is taken, which can be verified in different translations. Quasten's book might be much harder to get than other translations of the works by the Greek Fathers.
- ¹¹ "... [T]he primordial multiple is in no way directly sinful; on the other hand, since its gradual unification entails a multitude of tentative probings in the immensities of space-time, it cannot escape (from the moment it ceases to be 'nothing') being permeated by suffering and error. Statistically, in fact in the case of a system which is in process of organization, it is absolutely inevitable ... (1) that local disorders appear during the process... and (2) that, from level to level, collective states of disorder result from these elementary disorders (because of the organically interwoven nature of the cosmic stuff). Above the level of life, this entails suffering, and, starting with man, it becomes sin... [Footnote by Teilhard:] This clear-cut statement avoids the ambiguity of certain expressions which might result in evil appearing to be in man the pure statistical result of a process of evolution" (Teilhard 1971, 195).
- ¹² "Omega Point" is a term used by Teilhard to refer to the ultimate Consciousness that is driving the evolutionary process onward in the genesis of spirit. Such an Omega Point would coincide with what revelation tells us of Christ, and so could be identified with Christ. (Teilhard 1971, 143).
- ¹³ Order of St. Augustine, Augustinians
- ¹⁴ It is not necessary to specify exactly who, what, when, where, or how many the "first humans" were; nor to say that the boundary between nonhuman and human was either sharp or fuzzy, or that it was crossed by only one group, of whatever size; or if by more than one group then simultaneously by all. These things we do not know, and probably never will, especially if we define "humans" by such an intangible trait as moral responsibility. The essential point is that at one time there were no humans, however they may be defined, whereas at a later time there were; hence somewhere, in some sense, there must have been "first humans", however suddenly or gradually they attained that state.
- ¹⁵ This explanation does not, however, suffer from the misguided tendency, often attributed to St. Augustine, to place the blame on sexuality. The "stain" lies not in the mode of propagation but in the genetically and culturally programmed, selfish behavioral tendencies that are propagated.
- ¹⁶ In traditional technical terms, they are born in a state of "passive original sin" or *peccatum originale originatum*, as distinct from Adam's personal sin or "the Fall", which was "active original sin" or *peccatum originale originans*.
- ¹⁷ At best, the story of Adam could be read as an allegory of the collective selfish actions of our ancestors that were favored by natural selection, and thereby encoded into our genetic heritage.
- ¹⁸ For detailed responses to a wider variety of arguments and critiques raised by anti-evolutionists, see the "Resources" section.

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Suggestions for Further Reading

Detailed source information can be found in the Literature Cited section.

Part 1

For up-to-date presentations of the whole breadth and depth of the evidence for evolution and its mechanisms, see current college textbooks such as Price 1996 or Futuyma 1998.

For a concise *popular* summary of this subject, see National Academy of Sciences 1999, available online at <http://www.nap.edu>, or Zimmer 2001b.

Another web site devoted to evolutionary biology, sponsored by the National Science Foundation and endorsed by a number of professional biological societies, is <http://www.evolutionandsociety.org>.

For a detailed study of the genesis, philosophy, and logic of Darwin's theory, see Ghiselin 1984.

Miller 2001 gives a useful anthology of writings on the science as well as the theological implications of evolution.

Catholic theologian John Haught (2001) lucidly addresses "101 questions on God and evolution".

Goodall, J. 1986. *The chimpanzees of Gombe: Patterns of behavior*

Haught, J. F. 1998. *Evolution, in nature and Catholic thought*

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Connor, James L. 1968. "Original sin: Contemporary approaches"

Daly, OSA, Gabriel. 1987. "Original justice" and "Original sin"

Duffy, Steven J. 1988. "Our hearts of darkness: Original sin revisited"

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John Paul II, Pope. 1996. "Message to Pontifical Academy of Sciences on evolution"

Nessan, Craig L. 1995. "The fall from dreaming innocence: What Tillich said philosophically in light of evolutionary science"

Rahner, Karl. 1967. "Evolution and original sin"

Schoonenberg, Piet. 1965a. "Original sin"

Teilhard de Chardin, SJ, Pierre. 1971. *Christianity and evolution*

Vawter, Bruce. 1977. *On Genesis*

Appendix

For detailed responses to a wider variety of arguments and critiques raised by anti-evolutionists, see any of numerous recent books including Kitcher 1982, Godfrey 1983, Gastaldo and Tanner 1984, Strahler 1987, Berra 1990, Price 1990, Hughes 1992, Futuyma 1995, Schopf 1998, Kelley et al. 1999, Miller 1999, Pennock 1999, Skehan and Nelson 2000, and Haught 2001, as well as the *Reports of the National Center for Science Education* (Berkeley, CA) and the center's web site <http://www.natcensci.org>.

Alters and Alters 2001 is especially designed for use by high school and college teachers.