PERSPECTIVES on Science and Christian Faith

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In this issue . . .

"The fear of the Lord is the beginning of Wisdom."
Psalm 111:10

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Perspectives on Science and Christian Faith

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MANUSCRIPT GUIDELINES

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Environmental Awareness

Perspectives on Science and Christian Faith is providing a needed forum for the ongoing environmental discussion among evangelicals. Articles in recent months have included those that are strictly scientific and those that are purely theological. It is encouraging to see both perspectives make their distinctive contributions.

As a biblical theologian, I am encouraged by recent efforts to develop an independent biblical theology of creation which breaks away from its subordination to a theology of human salvation. The first is the 1994 Fortress Press publication, *From Creation to New Creation: Old Testament Perspectives*, by Bernhard W. Anderson. This book is a collection of Anderson's work over the last forty years. Anderson has spent much of his career interpreting Old Testament "creation" texts during a period when these same texts were neglected by Old Testament theologians. This neglect was due to the influence of Gerhard von Rad who made creation theology the servant of salvation history (human salvation). The contemporary ecological context has brought the work of Anderson to an important position. Anderson combines a sensitive reading of Old Testament and ancient Near Eastern texts with a contemporary awareness and application of these texts. The result is a biblical theology of creation which stands independently as a legitimate pursuit in its own right.

The second is the 1994 Hendricksen Publisher's *Creator and Creation: Nature in the Worldview of Ancient Israel*, by Ronald A. Simkins. Simkins combines the disciplines of Old Testament theology, cultural anthropology, sociology, and the history and archaeology of ancient Israel to construct a model of human-environmental relations. Simkins uses a values orientation model to investigate and systematize the ancient Israelites' values toward the natural world. Drawing upon the world view of Israel within her ancient Near Eastern context, Simkins maintains that Israel had three solutions to the human/nature relationship: (1) subjugation to nature, (2) harmony with nature, and (3) mastery over nature. The second solution was generally chosen in Israel while the other two solutions were chosen under special circumstances or by certain subgroups within the culture. Israel's preferred choice was directly related to its values orientation preferences. This is in contrast to Westerners who prefer the mastery over nature solution. Simkins fresh approach to Israel's texts, world view, and values contributes toward a new understanding of ecology in ancient Israel.

These works are indications that environmental awareness is increasing among biblical theologians and that the awareness has vitality. This coupled with the *Evangelical Declaration* are reasons to be encouraged.

My hope is that the discussion will continue and that the ASA and *PSCF* will be at the forefront of it.

Phil Schafran
Guest Editor

In This Issue

This issue builds on the theme of the 1993 Annual ASA Meeting, "Caring for Creation."

Richard Wright's article points out the need for environmental discussion that is scientifically precise, theologically penetrating, and culturally applicable. An environmental ethic cannot be marginalized into a left wing (radical feminism, Gaia hypothesis, eastern mysticism) or right wing (political conservatism, New Age paranoia, scientific imprecision) agenda.

The recent *Evangelical Declaration on the Care of Creation*, signed by hundreds of higher-education and church leaders, is a very positive step forward in presenting an environmental ethic which avoids extreme ideological rhetoric. The declaration resists "both ideologies which would presume the gospel has nothing to do with the care of nonhuman creation and also ideologies which would reduce the gospel to nothing more than the care of the creation."

Theologically, the Declaration encourages deeper reflection on "substantial biblical and theological teaching which speaks of God's work of redemption in terms of the renewal and completion of God's purposes in creation." James Peterson's article and mine are efforts to address the ecological issue from biblical and ethical perspectives.

Tearing Down the Green: Environmental Backlash in the Evangelical Sub-Culture

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The environmental movement has a political agenda that has enjoyed some success and in the process generated a significant backlash movement. Evangelical Christians are on both sides of this controversy, causing no small confusion in the ranks of believers. Several case studies of anti-environmentalism show the dimensions of this controversy: 1. Criticism of the Evangelical Declaration on the Care of Creation; 2. The charge that global eco-war is being planned as a way for government to gain more control over people; 3. The emergence of the Wise Use movement; 4. The writings of E. Calvin Beisner and Larry Burkett, an economist and a financial advisor, challenging environmentalism from a Christian perspective; and others. Some people argue that the battles over environmentalism are basically political, and that the Christian attack on the environmental movement is primarily a political attack from the right in the name of Christianity. In this paper, I explore the scientific dimensions of the controversy—that the anti-environmentalists use poor scientific work and discount the mainstream scientific consensus on the environment. Next, a look at the religious dimensions shows that both sides in this controversy use Scripture to support their views. I then explore the fundamental world view differences between environmentalists and the backlash movement. I conclude that a Christian world view does not conform to either camp, but calls people of faith to care for the environment because it is God's good creation and we are to be His stewards.

Environmentalism represents a broad spectrum of people and organizations with a strong interest in protecting the natural world and encouraging greater human concern for that world. It is fair to say that environmentalism intends to cause changes in how people relate to the natural world — that is, changes in people's behavior and in public policy. Because it also involves people's beliefs and values, there is often a religious dimension to the environmental movement. Other components to the movement include science, education, and economics. But environmentalism has primarily a political agenda, and during the past 25 years, environmentalists have been successful in implementing action in support of that agenda.

Recent years have seen a growing reaction to environmentalism — an environmental backlash. This reaction has arisen as a response to some beliefs and actions of environmentalists, especially those that have had a perceived or real economic impact on individuals or organizations. This movement also has a political agenda; they want to restrict the regulatory powers of government. One strategy of this movement is to call into question most of the scientific claims of the environmentalists about re-

sources, pollution, and population. Another is to label the movement as politically socialistic and religiously pagan or earth-worshiping.

Evangelical Christians can be found on both sides of environmental issues: some are highly supportive of environmental concern, calling for Christians to take more seriously their calling to be stewards of God's Creation. Others, however, are critical of environmentalists, citing the political directions and anti-Christian religious elements found in the movement.

What are we to make of this controversy? Environmentalist vs. anti-environmentalist has all the appearances of a clash of basic world views; to confuse matters, some of the Christians on both sides are claiming to have scientific findings and biblical truth supporting their position. Is this another case of the Christian world chasing after secular movements and putting a Christian spin on them? Is there a unique Christian world view to be clarified and distinguished from both movements? Do the two sides have different political orientations? What are we to make of both sides' claims that they have strong scientific support for their views and agendas? We begin an answer to these questions by presenting several case studies of anti-environmentalism.

Case Studies

Evangelical Declaration on the Care of Creation

The newly created Evangelical Environmental Network, associated with Evangelicals for Social Action, has drawn up a 1600-word declaration on Christian concern for the environment[1] (see p. 110) and is soliciting endorsements from many evangelical leaders around the country. It is a strongly worded, uncompromising document that calls on Christians to acknowledge the extent of degradation of the Creation, to repent of attitudes and actions that have continued that degradation, and to commit anew to being a good steward of God's Creation and to providing justice for people who do not enjoy "creation's bounty" — the developing world. The declaration encourages Christians to join with others — Christians and "all those who are concerned about the healing of creation" — to work toward changing how people relate to the natural world.

Having obtained a copy of the circulating Declaration, *World* responded in November 1993, with a news analysis/editorial entitled "Are God's Resources Finite?"[2] that was critical of the Declaration. The *World* broadside has resulted in an editorial battle, reflected in a recent *Prism*[3] (published by Evangelicals for Social Action). The thrust of *World*'s analysis, written largely by Christian economist and author E. Calvin Beisner, is that the Declaration is seriously flawed. In declaring that the environment (the Creation) is being degraded at all, claims of environmental degradation are said to be highly exaggerated and largely false. Beisner accuses the authors of mimicking "the claims of crisis current in the popular press and the secular environmental movement without checking the credibility of those claims." The editorial lists the drafters of the Declaration and challenges their "expertise in environmental science and theory." Citing a few positive principles in the Declaration, Beisner then charges that the document is weak theologically and reflects a faulty view of resources and human relationships with the natural world. Beisner is optimistic about human creativity and accomplishments, and points to a world that is getting better, not worse, under human dominion.

Criticism of environmentalism is consistent with *World*'s general stance on environmental issues. For example, environmentalists are pictured as deliberately putting people out of work by their involvement in the controversies over timber harvesting and endangered species like the spotted owl,[4] and by their promotion of governmental regulations to reduce pollution.[5] *World* compares the EPA and the

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OSHA with the Gestapo, claiming that regulations go "far beyond minimal standards for good health. The social engineers of our government are absolutely committed to bigger government and national socialism."

Other Christian journals — *Moody Monthly, Christianity Today, World Vision,* for example — have tended to take the message coming from the environmentalist side quite seriously, and have strongly promoted Christian environmental stewardship as the proper Christian response to environmental ills.[6] *World,* however, is not alone in challenging the environmentalist message in evangelical circles.

Earth in the Balance

In 1992, then-Senator Al Gore published a book on the environment, *Earth in the Balance,*[7] that became a bestseller. The book is somewhat autobiographical, documenting Gore's experiences and beliefs that have led him to produce a book that is an environmentalist's dream. Here is a leading politician, now Vice-President, who speaks the language of environmentalism, understands the scientific literature, and is calling for the environment to be the central organizing principle of the 21st Century.

Gore claims that our civilization has lost its crucial connections with the natural world, and seems equally disconnected with the future; it is now embarked on a collision course with the environment, which is our life support system. After documenting the crises of air pollution, global warming, ozone layer depletion, water pollution, deforestation, soil erosion, and the like, Gore states: "Unless we find a way to dramatically change our civilization and our way of thinking about the relationship between humankind and the earth, our children will inherit a wasteland."[8] Gore refers to his basic Christian beliefs and sketches out an eco-theology, which he expands to include all of the world's religions in pointing to the need for a spiritual change to weather the crisis. The book also provides details of a "Global Marshall Plan," some of which are quite radical, to turn our political and economic systems towards solving, not making worse, our environmental problems.

Late in 1992, the *Spiritual Counterfeits Project Journal* (*SCP*) published an entire issue called "The Way of Ecology."[9] The issue contains, among other articles, a review of Gore's book entitled "America's Ecological Millennium — Al Gore in the Balance" by Doug Groothuis. Groothuis addresses Gore's roles as environmentalist and Christian, and does so in a balanced way. But the main article of the issue is "The View from Iron Mountain — Planning Global Eco-War" by Brooks Alexander. Alexander refers to a disturbing book published anonymously in the late 1960's, *Report from Iron Mountain on the Possibility and Desirability of Peace.* This book purports to be written by a participant in high-level discussions who must remain anonymous to protect his reputation. It describes a series of meetings addressing the question of what would happen to the United States if a condition of "permanent peace" should arrive — and a program of how to deal with the consequences.

The book describes how the participants (also anonymous) laid out a thesis for the necessity of war to maintain internal stability in nations, concluding that the elimination of war might lead to such social and political unrest in societies that peace can be seen as a threat to those societies. The "report" concluded that war would have to be replaced, if peace were to "break out," with something that would play the same role in maintaining stability, a response to some large threat that would mobilize a society in much the same way a war does. If the threat does not exist, the group maintained, it must be invented. The "group" proposed several candidates, but concluded that the most likely substitute for war would be environmentalism.

Enter Al Gore. Gore tells us "we must make the rescue of the environment the central organizing principle for civilization." Alexander goes for the jugular: here is the manifestation of our new war-substitute — *global eco-war.* He admits that Gore may not have even read *Iron Mountain* (but suspects that he has), but clearly his program fills the bill admirably for that new organizing principle that will keep nations internally stable. Alexander's fear is that what is now happening in society — the persistent message that we are in danger of seriously damaging our planet and its atmosphere — is a threat manufactured to serve the needs of those who want government to conduct social management of its people and perhaps forge an international agency with control over other nations. In effect, the ecological crisis is part of a political conspiracy. Other articles in the issue reinforce this theme.

The Wise Use Movement and Rush Limbaugh

Mainstream anti-environmentalism is seen most clearly in what is called the Wise Use Movement, and in the work of Rush Limbaugh. On Feb. 4, 1992, ABC News *Nightline* featured a debate between Al

Gore and Rush Limbaugh called "The Environmental Movement's Latest Enemy."[10] The newscast setup for the debate presented the views of a group called the Wise Use Movement. Their spokesperson, Ron Arnold of the Center for Defense of Free Enterprise, states: "We intend to destroy the environmental movement once and for all by offering a better alternative, the 'wise-use' movement."[11] This movement consists of a loosely organized group of private landholders and organizations whose common interest is maintaining freedom of access to public lands — the motorcycle industry, oil companies, mining groups, the timber industry, and the National Rifle Association. The movement has nothing good to say about environmentalists: they are "anti-people and pro-owls," they "exaggerate their claims in order to gain control" (e.g., ozone depletion, toxic pollution, endangered species needs, etc.), they are "tree-worshiping pagans," and their activities are "stifling the economy and putting people out of work." For financial support, Arnold has also tapped into the American Freedom Coalition, an arm of Sun Myung Moon's Unification Church.

[The wise-use] movement consists of a loosely organized group of private landholders and organizations whose common interest is maintaining freedom of access to public lands . . .

Rush Limbaugh applauds the efforts of the Wise Use Movement to contain environmentalism and explains in his presentation how the environmentalists have promoted a fragile earth and a crisis mentality. Limbaugh calls them the new home of socialism and a doomsday industry who want to shut down business. He asserts that their activities are an assault on the American way of life.[12]

Speaking on the newscast for the environmental community are Bruce Hamilton from the Sierra Club and, of course, Al Gore. Hamilton admits that the Wise Use Movement has to be taken seriously by the environmental movement, and counters their claims about the damage being done by environmentalism. Gore responds to Limbaugh's charge that ozone layer problems are highly exaggerated by referring to specific scientific findings in support of a damaged layer. Gore also reaffirms his conviction that the earth is indeed fragile, and that human beings can do serious damage to the global environment. The televised debate ends with the opponents hopelessly disagreeing on everything except the importance of paying attention to the business community and affirming capitalism and democracy.[13]

Healthy Growth or A Fading American Dream?

Without any doubt the two most prominent critics of environmentalism from within the Evangelical fold are E. Calvin Beisner and Larry Burkett. Beisner's book *Prospects for Growth*[14] is directed toward refuting the notion that human population growth and resource use are problems. His editorial in *World* is likely a preview of a book on the radical environmental world view. In the editorial, Beisner counters each of the "degradations of creation" listed in the Evangelical Declaration, and concludes that there is no serious environmental problem in the world today.

In his book, Beisner leans heavily on biblical passages that (1) present children as a blessing from God as proof of the mandate to multiply and fill the earth (he points out that the earth is not yet filled); and (2) support the derived ideas that humans are "subordinate owners" of the earth (Psalm 115:16), not just stewards; and that God-given human creativity, reflected in our present civilization, more than cancels the negative impacts that the Fall has had on the Creation — i.e., things are getting better, not worse.

For his "scientific" sources, Beisner taps into the work of the prominent anti-environmentalists Julian Simon, Herman Kahn, Fred Singer, and Dixie Lee Ray, and chooses to ignore the evidence against his views that can easily be found (see, for example, publications of the World Resources Institute,[15] Worldwatch Institute,[16] and World Bank,[17] all of which broadly represent current research and consensus in the scientific community). Beisner, it seems, takes the views of the more conspicuous anti-environmentalists and puts a Christian spin on them, concluding that more growth in human population and resource use is not only environmentally sound, but is also justifiable from a Christian perspective.

Larry Burkett is a well-known financial advisor and president of Christian Financial Concepts, a ministry designed to promote "God's principles for financial management." Unlike Beisner, Burkett is pessimistic about the future, and has laid out the reasons for his pessimism in *What Ever Happened to the American Dream*.[18] Burkett's American Dream is the expectation that each generation could, with hard

work, live better than the previous generation. Two fundamental processes are causing that dream to fade: the enormous federal debt built up over the past two decades, and the growing burden of governmental regulations. This book addresses the latter problem; an earlier book deals more directly with the debt problem.[19]

Burkett holds that environmental extremists have gained control over the political process, having done so by frightening the public into believing that environmental problems are far more serious than they are.

Burkett targets the problem of environmental regulations in detail. In brief, Burkett holds that environmental extremists have gained control over the political process, having done so by frightening the public into believing that environmental problems are far more serious than they are. The problems of global warming, acid rain, ozone depletion, asbestos, and pesticide use — to cite the most prominent ones — are overblown precisely so that environmental extremists can gain control of our political system. Behind them are the mainline scientists who use scare tactics to get unquestioned public support for their scientific empires. The net effect of the regulations is to lay on the economy an enormous burden of unnecessary costs that saps the strength of the economy and are dooming Americans to a future in decline (while we watch jobs evaporate or disappear overseas).

To support his "scientific" pronouncements, Burkett cites many articles from *New American*, an ultra-right wing journal, and many popular writings of anti-environmentalists used by Beisner as authoritative sources. Burkett consistently ignores the writings of mainstream scientists in favor of the journalists and others with a clearly political axe to grind. The book contains many statements that lack scientific support; they are simply untrue. For example, writing about how DDT was withdrawn by the EPA because of its impacts on birds, especially raptors like the bald eagle and osprey, Burkett states: "...there is no (repeat no) evidence to support any of the wild claims made about DDT."[20]

Burkett is perhaps at his very worst when he takes on global warming (Ch. 8: The Global Warming Myth) and ozone depletion (Ch. 9: The Hole in the Ozone Myth). He repeats many criticisms of these climatic phenomena, essentially all of which have been thoroughly refuted in the refereed scientific literature. For example, writing about the chlorofluorocarbons (CFCs), Burkett states: "CFCs are significantly heavier than the Earth's air, and no one to date has explained how they would 'float' into the upper atmosphere" — this in spite of the fact that CFCs have been so carefully measured in all parts of the atmosphere that essentially all that have ever been produced have been accounted for.[21] A spectacular example of Burkett's inexpertise is seen in his reference to some 910,000 metric tons of CO_2 coming from the Mt. St. Helen's eruption as "dwarfing the output of CO_2 of all industrial sources"[17] — completely oblivious of the fact that the annual release of CO_2 from the burning of fossil fuels is more than *18 billion* metric tons![22]

Gaia, New Age, Eco-Feminism, and Deep Ecology

Out on the fringes of the environmental movement are several ideologies with strong religious thrusts. Gaia—earth goddess of the ancient Greeks—has been resurrected to give substance to a semi-scientific hypothesis that the earth can be regarded as a single living entity with capabilities of self-regulation. In other words, life itself controls the environment to suit its own needs. The New Age Movement and radical feminist groups have embraced the concept of an earth Mother in their religious thinking. Earth becomes sacred (as in many pagan religions), and therefore environmental degradation becomes a blasphemous act. The most radical form of environmental "religion" is Deep Ecology—an ideology that assumes all of life to be on an equal footing and strongly opposes mainstream environmentalism, Christianity, Gaia, and New Age visions of how humans should relate to nature. Deep Ecology rejects any form of human control of the natural world. The first issue of *SCP Journal* for 1991 was devoted to an analysis of these "environmental religions"; *Themelíos* has also presented some excellent reviews of these "Green religions."[23]

Some Christians are quite concerned with what they see as a tendency to embrace elements of this new "Ecotheology," in a desire to unite with all who are willing to work towards more responsible stewardship of the Creation. Some see a willingness to make Earthkeeping the main thrust of the Church's message, downplaying the evangelistic thrust of the gospel and blending Christianity with paganism.

The Evangelical Declaration on the Care of Creation makes a clear effort to avoid these two errors.

Christian Guilt for the Ecological Crisis

For many years and in many contexts, Christianity has been castigated for being the source of Western civilization's willingness to make full use of the earth and natural species to further human progress. This accusation began with Lynn White's article in *Science*, 1967, entitled "The Historic Roots of Our Ecologic Crisis."[24] White traced both modern science and technology to Christian doctrines of human dominion and the notion of progress, and claimed that exploitation of the environment was a consequence of Christianity. This claim has been addressed by many, including myself.[25] I pointed out that irresponsible exploitation of the environment could be found in many cultures not influenced by Christianity, and that the real source of the problem is to be found in the human heart— that human pride, greed, and carelessness are the source of our ecological crisis.

Writing in *SCP Journal*, Coffman and Alexander, referring to White's charge, saw the possibility that a new generation of "earth protectors" will actively prosecute a campaign against biblical Christianity because of its perceived "earthcrimes." *SCP Journal* pictures a violent world view clash between "the anthropocentric" Christian ethic that has dominated Western culture, and a new, biocentric, mystic-pantheistic Green religion that will seek to water down Christian belief and fuel a political and social revolution where earth is revered.[26]

Sex Education and Family Planning

Although pretty far afield from these ideological issues, it should be noted that evangelical Christians are usually in the forefront of protests against sex education in public school systems, and are highly critical of the international family planning movement.[27] There are several concerns here. The most important one is a strong pro-life stance that sees abortion as one option promoted in many family planning programs. A second concern is that sex education will encourage sexual activity in teenagers because of its explicit explanations of the birds and the bees and especially, contraceptive techniques.

On the other side of these issues are people concerned about teen-age pregnancies and the spread of AIDS, who argue that sex education holds the only possibility of changing the behavior of teenagers in a pluralistic society like ours. The increasing incidence of teen-agers with AIDS, acquired heterosexually, has pushed this controversy to the front burner.

Their aversion to abortion has led many Christians to oppose any notion that population growth is a serious problem. In doing so, they are in direct conflict with one of the most pervasive of environmental concerns: that human population growth continues to cause widespread environmental degradation and places unsustainable demands on resources. Family planning programs represent the most logical and cost-effective way to help nations reduce their fertility.[28]

Dimensions of the Controversy

Political Dimensions

Concerns about the environment — which we as Christians can properly view as part of God's Creation — have been around even before the first Earth Day in 1970. However, since the early 70's, environmentalism has gathered steam and has become a true movement in our society and in many other parts of the world. There are all shades of environmentalists, and they are often a part of a large and influential collection of what are called NGOs (nongovernmental organizations). These organizations effectively mobilize grass-roots activism by putting together a constituency of like-minded people, keeping them informed, and acting to promote their agendas in local and global arenas. The environmental NGOs are now a well-recognized interest group, with lobbying activities in Washington and local or regional offices to carry out their campaigns for membership and political action.

Some prominent NGOs are the Sierra Club, the National (and local) Audubon Societies, The Wilderness Society, The League of Conservation Voters, Greenpeace, Zero Population Growth, The Union of Concerned Scientists, etc. These groups have become politically wise — they know how Washington works. It is a game of power and influence, with the stakes often going to those who can garner the most media coverage or generate the most letters and telegrams to key Congressional politicians or regulatory agencies. Their critics suggest that even the best-intentioned environmental interest groups will be tempted to exaggerate on an issue to generate membership support.

Politically, environmental interest groups have tended to lean to the left of center — not, I believe,

because of any intrinsic socialist philosophy, but because they have found more support from politicians who seem to be concerned with social issues and are less willing to favor the big business interests, who also have their influence on the political scene. Environmentalists are highly skeptical of classic American capitalism, with its minimalist, hands-off approach to regulation. Accordingly, the Democratic Party has more frequently been seen as the party for environmentalists. The presidential parade of the last two decades has helped draw the political lines for the environmental movement; Jimmy Carter and now the Clinton-Gore team are viewed as having strong environmental ties, while the Reagan years are regarded as the low point, environmentally, with Bush attempting to make some corrections in the Republican record. The 1994 Republican tide that swept the Congress will undoubtedly create some challenging times for environmental concerns.

It is conventional wisdom that Washington bureaucrats . . . tend to favor the regulatory approach to solving environmental problems, whereas the parties being regulated . . . view every regulation as a drag on the economy and worse . . .

It is conventional wisdom that Washington bureaucrats — especially those in the regulatory agencies — tend to favor the regulatory approach to solving environmental problems, whereas the parties being regulated — business and industry in particular — view every regulation as a drag on the economy and worse — an infringement on the freedom of the market system that has been a hallmark of the American way. Environmentalists point to the need for and, then, the successes of regulation in such legislation as the Clean Air Act, the Endangered Species Act, the several acts dealing with Toxic Waste (Superfund, Toxic Substances Control Act, etc.), and the ongoing work of such Federal agencies as the EPA, the Fish and Wildlife Service, the FDA, and the OSHA.

Those on the political right, whose views are quite effectively expressed by Rush Limbaugh, contend that excessive regulation has led to economic disaster in case after case, and is part of a general political malaise. Some Christians echo these sentiments, for example, Larry Burkett says, "Most of our regulations are not designed for solving problems, but rather to expand the government's authority."[29]

As the case studies above have shown, anti-environmentalists often speak in terms of conspiracies and intrigue, where the motives ascribed to environmentalists are designed to paint them as communists or socialists with a lust for power, control, and manipulation. I think this strategy is counterproductive, as it clearly strains the credibility of all but those who are committed to conspiracy theories. Interestingly, these charges can also be found in *The New American*, a journal sponsored by the John Birch Society. This journal is a major source of the "science" used by Larry Burkett in *What Ever Happened to the American Dream*!

My point here is to make it clear that the classical political alignments are very important in understanding the views different people and groups have about the environment. Environmental concerns have ceased being apple pie and motherhood issues (in the words of Ted Koppel), and are now part of the larger political dichotomy that pits conservatives against liberals, businesses against regulators, economists against ecologists, with all shades from far right to far left to be found. The farther to the political right one is, the more anti-environmental; the farther left, the more environmentalist.

These political orientations should, however, be separated from the next two considerations — science and religious belief — and unfortunately, they often are not when it comes to the question of Christian anti-environmentalism. Obviously, where one stands politically or religiously does not need to have anything to do with whether a person has strong environmental convictions. However, evangelical Christians are very often drawn to the more conservative political viewpoints because (1) they are already religiously conservative; and (2) they perceive that the other camp contains proponents of such views as pro-choice, equal rights, radical feminism, New Age, and secular humanism. Who wants to keep company with these convictions? So, very often, environmental concerns are thrown in with a lot of undesirable baggage, and discarded with the rest of the baggage.

Scientific Dimensions

Concerns for toxic wastes, pesticide impacts, global warming, ozone depletion, and routine air and water pollution were first raised by scientists with reputable credentials. The professional scien-

tists addressing their specialties have tended to become the advocates for political and social change. Because scientists have a great deal of credibility in our society, their advocacy for environmental issues carries weight with the media, the public, and the policy-makers.

All environmental issues are grounded in scientific work . . .

All environmental issues are grounded in scientific work, from ecology to demography to atmospheric chemistry. For example, the EPA makes a strong effort to base their regulatory rules on scientific research, employing a strategy called risk assessment to evaluate the risk of a given technology or practice for human or environmental damage. Each environmental NGO hires scientifically-trained staff to evaluate the copious literature that relates to human impacts on the environment. In developing arguments for their views, the environmental NGOs invariably call on the findings of scientists for support. And the media follow suit.

But this is a game two can play, and the anti-environmentalists also dig into the scientific literature to find research that supports their opposing views. They are often successful in locating (or publishing their own) books and journal articles written by scientists taking issue with practically every major item in the environmental agenda.

A good example is the issue of a diminishing ozone layer in the stratosphere. Articles and books have been published on both sides of the issue. On the one hand, there is the claim that the increased release of CFCs from refrigerants and solvents over the past 30 years has led to the Antarctic ozone hole and a general thinning of the ozone layer everywhere. Yet, anti-environmental activists bitterly oppose this view.[30] However, the prevailing scientific consensus clearly supports the CFC theory; ultraviolet radiation is definitely on the increase because of the thinner ozone layer.[31] Where does the opposition come from, then? Here it can be traced to a few skeptics who have not done any work in the field but have misinterpreted the scientific parameters. The anti-environmentalists have picked up and propagated the errors, compounding them, and continuing to make use of them in spite of repeated rejoinders from scientists in the field showing where they are wrong. The media often make matters worse by devoting equal time to both sides of the issue, implying that there is equal support for the opposing views and that the truth is likely to be somewhere in the middle.

The uninformed public — indeed, most of us — is therefore dependent on whatever media source they encounter and can easily be misled into believing exaggerations and untruths. How can this be avoided? In evaluating statements about the environment, the best guard against swallowing untruths is to look carefully into both sides of an issue and get in touch with the basic scientific work underlying the issue.

In this regard, it is important to distinguish among the **refereed literature**, which contains the original scientific work of the scientists working in the environmental field; the **gray literature**, which consists of reports by agencies and other organizations; and the **popular literature**, which is the books and journals written for profit or propaganda.[32] The reliability of the science declines significantly in going through this progression! Some of what poses as science is very clearly propaganda, but it is not easy to know this unless you have dug more deeply into the literature on a given issue, and clearly distinguish between science and interpretations of science. Textbooks in science represent a special case, where the work of scientists is presented in a format that attempts to synthesize the current state of knowledge. The information from which textbook science is drawn is always cited in the appendix or reference pages. Check these to see what kind of literature was used for the text.

Unfortunately, the bottom line for many will be, whom do you want to trust? Do you trust Rush Limbaugh to give you a scientifically accurate picture of global warming and acid rain? How about Ted Koppel? Do you trust your Christian magazine because you believe that it stands for the truth? In the final analysis, there is no substitute for scientific literacy and the ability to read and understand the original reports of the scientists. However, since this literature is inaccessible to many in our society, the question of trust remains. My recommendation would be for you to search for media with no obvious ties to a political agenda; some examples would be this journal (*Perspectives on Science and Christian Faith*), many major media journals (*Time, Newsweek*, etc.), and many scientific journals (*Scientific American, Nature Conservancy, Discover*, etc.).

Religious Dimensions

It is evident from the case studies that religious belief plays an important role in environmental con-

troversies. As we saw, Christianity has been a convenient scapegoat when questions come up about how our Western societies have gotten themselves into environmental trouble. Furthermore, New Age, Gaia, and Eastern religions have no trouble sanctifying and worshiping the Earth and other elements in the created order, and so can be seen on the side of the environmentalists. Yet there is a strong segment of evangelical Christian thought that claims to provide the key to the environmental problems, and their analysis is thoroughly supported by Scripture.[33] The Evangelical Declaration on the Care of Creation provides a good summary of this thinking. Until recently, the biggest problem environmentally active Christians have had with their fellow believers was apathy — and perhaps that continues to be the most serious problem. Apathy toward environmental concerns is also characteristic of the society in general, and so it is no surprise to find it alive and well in Christian thought and practice.

... it is possible to present opposing views supported by principles derived from Scripture.

Now, however, there is the emerging Christian anti-environmentalism I have documented in this paper. The presumed biblical support for this position is currently found primarily in Beisner's work; Burkett does not offer biblical support for his views. For example, Beisner cites biblical passages that encourage procreation opposing those Christians who might claim that continued population growth is a problem, and concludes that "no state ought to discourage fertility," and that Christians are those "who count it a blessing to be fruitful and multiply."[34]

Beisner also offers presumed biblical support for his views on resources, deriving many theological and moral standards to be applied to the management of resources. From those principles, Beisner reasons that: (1) "... man, not the environment, is primary." If the environment is to be protected, such protection is "for the sake of man, not for its own sake. Anything else is idolatry of nature."[35] (2) "...no entity, private or public, has proper authority to restrict others' use of property." Thus, "Planning and control of resource use should ... be left to the owners of the resources."[36] Beisner favors a minimization of state ownership of resources, and a maximization of private ownership and therefore liberty to make use of God's good provision of the earth's bounty.

It is fair to say that these views, which are derived from Scripture but are not explicitly supported by the Bible, are controversial. At the very least, it is possible to present opposing views supported by principles derived from Scripture. For example, the dominion mandate (as it has been called), from Genesis 1:26-28, can be taken to mean that God gives us a right, as Beisner puts it, to the "free use and development of resources ... that the earth, with everything in it . . . was intended by God to serve man's needs. Man was not made for the earth; the earth was made for man."[37] It can be argued equally that dominion does not mean slavery of the rest of creation to humankind, that our task is to care for creation as Adam was to care for the garden (Genesis 2:15), and that the earth and the creatures in it were made to glorify God (Psalm 24), not to serve man. As we saw above, Beisner admits that the environment should be protected, but only because it is important to man. On the other hand, it can also be argued that since the creation (which is the environment!) has as its first purpose to glorify God, and God values his creation (he called it good in Genesis 1), it is not idolatry of nature to protect creation as God's stewards.

One is led to the conclusion that both sides in this controversy may find support for their environmental views from Scripture, and that the primary orientation and motivation for searching for this support may be a prior commitment to a world view.

World View Analysis

At this point then I would like to move to a discussion of world views. Each of them represents a set of beliefs, supported by sources of information believed to be accurate, and laying out an agenda for action. This perspective helps us to sort out the controversies and perhaps put them into a Christian perspective.

Environmentalist World View

On Science: The picture we are getting from scientists studying the interactions of human civilization and the environment is accurate. The trends are not encouraging.

Population: Human population growth is reaching unprecedented numbers and makes all of the other problems worse. It is increasing exactly where it can be least well supported — in the Third World.

Global pollution: Global warming is likely to occur because of the increase in greenhouse gases; the ozone layer is becoming thinner because of CFCs that have made their way up to the stratosphere.

Extinctions: Human societies are continuing to push back natural species by replacing their habitats with cattle, roads and agriculture. Species are probably becoming extinct at a rapid rate, but we do not know because they have not all been found and classified.

Other Concerns: Deforestation is proceeding at an undesirable rate, fisheries are becoming depleted because of serious overfishing, air pollution in urban areas is creating more and more human health problems, soil erosion is causing a large loss in productivity of heavily managed agricultural land, toxic chemicals and nuclear power represent poorly managed technologies that are a serious threat to humans, water pollution is degrading much of our freshwater systems, the gap between the rich and poor countries is getting greater, etc.

Public Policy: Our political system, from the local level to the national level and even internationally, must respond to these trends before they lead us into serious social and economic decline. This means putting controls on the rates of use of biological resources like the grasslands, forests, and fisheries. It means addressing the industries and technologies that are responsible for pollutants that toxify the air, land, and water. It means helping the more populous nations to reduce their fertility with family planning methods. It even means committing ourselves to international agreements so that we can bring about worldwide relief from global warming, ozone depletion, and biodiversity loss. The market can be used to accomplish some of these things, but unregulated free enterprise has always led to greed and exploitation, not just of the natural environment but also of people.

Backlash World View

On Science: Most of the mainstream scientists are mistaken about the state of the environment. They are overlooking many good things that are happening, and exaggerating the problems, often to gain support for their research.

Population: Overpopulation is a myth. The world is full of unused land and can easily support many more people. Human creativity and productivity can solve our resource and environmental problems if they do get worse.

Global pollution: The ideas of global warming and ozone depletion are not supported by the data. Neither of these situations is likely to happen, because the earth is robust and humans are not able to affect its systems.

Extinction: There is no good evidence that many species are becoming extinct. The ones that do are undoubtedly poorly adapted and not essential to natural systems.

Other Concerns: Each environmentalist concern is exaggerated and based on an inaccurate assessment of human interactions with the environment. Environmental organizations need members, and they use scare tactics to get them.

Public Policy: Because of environmental and resource concerns, our society has built a system of regulations that impose enormous costs on the private sector and effectively stifle economic progress. Public lands should be opened to multiple use; mineral resources in wilderness areas and national parks should be developed; restrictions on privately held lands because of wetlands or endangered species should be abolished. We should back away from any international agreements on the environment, because of the danger of losing our sovereign rights. If the environmentalists have their way, we will likely drift into an authoritarian, socialistic government, perhaps even into a world government that will take away our sovereignty. In the end, private enterprise, capitalism, and the free market represent the best approach to solving environmental and resource problems.

The Roots of Christian Anti-Environmentalism

It would be hard to find two sets of fundamental beliefs about the world that are more in conflict. It is as if the two camps were living in two different worlds. At every turn, they will disagree about what we should do.

The primary concern in this paper is to understand environmental backlash within evangelical Christianity. As I have looked into this subject, I have become convinced that Christian anti-environmentalism can be traced directly to political commitments. The arguments about how questionable the science supporting environmentalism is, and the influences of New Age and pagan religions on environmentalists are not the basic issue—but red herrings. The religious argument is true only of the **radical fringe** of the environmental movement. The science argu-

ment is patently indefensible when it is scrutinized carefully. Even many political arguments — the conspiracies, the socialistic and authoritarian control — are tactics calculated to generate fear and antagonism, and are a direct offspring of the cold war. It is a fact that the political right has lost its traditional enemy — world communism — and appears to be in the process of replacing it with world environmentalism. The Christian political right is following right along the party line with the John Birchers, Wise Use Movement and Rush Limbaugh. This does not reflect well on the Gospel!

There is a solid core of environmentalists — and Christians — who reject the radical fringe of the environmental movement and stand solidly with the mainstream of the science community as they document what is happening to the earth — not for political reasons, but out of a deep love of nature and often out of sincere humanitarian concern. They deplore the tactics of the anti-environmentalists as they try to caricature the whole environmental movement by some tactics and beliefs of fringe groups, and deliberately downplay and deny unmistakable evidence that all is not right with the earth.

Christian World View

It is the duty of all Christians to develop a uniquely biblical world view — that is, to bring biblical truth to bear on all of life, and not to accept everything that comes to us from a culture that is thoroughly secular and often destructive to Christian thought and practice. There is a spiritual battle going on, and it is going to be felt in all of the affairs of humans. The world view conflict between environmentalists and anti-environmentalists reflects the spiritual condition of fallen humankind very well. These two sides have different visions of the good life and how to achieve it. Neither side understands the biblical doctrine of human depravity and the inability to escape its consequences. Neither side understands the environment as God's creation, nor humans as appointed both to dominion and stewardship acting as God's viceregents and imaging him.

We do not need to embrace either of these camps and become the religious camp-followers that they might want to provide some moral legitimacy to their agendas.[38] On the positive side, the biblical world view may hold the key to this controversy. We do not owe our allegiance to any political party or philosophy, but to a higher authority. What the earth needs are stewards, people who see themselves as caring for something that does not belong to them—God's good creation—which should be protected and justly shared with present and future generations. Christian stewardship should be a natural outworking of our common faith; if more Christians were to take their stewardly calling seriously, we could hold up our faith and practice as "essential to the solution of our ecological problems," as the Evangelical Declaration puts it.

Notes

[1]The December/January 1994 issue of *Prism* contains the text of the Evangelical Declaration on the Care of Creation, and an article by Calvin B. DeWitt, "Take Good Care — It's God's Earth."
[2]*World* 8: 27: Nov. 27, 1993, pp. 10-13.
[3]*Prism* 1: 2: Dec./Jan. 1994, p. 7.
[4]*World:* March 20-27, 1993, p. 33; June 18, 1994, pp. 10-13.
[5]*World:* Sept. 4, 1993, pp. 22, 24.
[6]See *World Vision*, April-May 1993, Calvin DeWitt with Ken Sidey, "A Question of Balance: Poverty or Pollution," pp. 4-7; *Moody Monthly*, Oct. 1989, Jim Morud, "Creation Groans: Are Christians Listening?"; and a special presentation of the CT Institute in *Christianity Today*, April 4, 1994, "Eco-Myths" — a series of articles by David Livingstone, Calvin B. DeWitt, Loren Wilkinson and Kenneth Kantzer.
[7]Al Gore, *Earth in the Balance: Ecology and the Human Spirit* (Boston: Houghton Mifflin Company, 1992).
[8]Ibid., 163.
[9]*Spiritual Counterfeits Project (SCP) Journal* 17:3, 1992.
[10]I featured this newsclip in a video case study in my co-authored text, *Environmental Science: The Way the World Works*, 4th Ed., Bernard J. Nebel and Richard T. Wright (Englewood Cliffs, NJ: Prentice Hall, 1993). This and many other newsclips are made available to those adopting the text for their courses.
[11]See articles in the *Boston Globe*, Jan. 13, 1992 and Oct. 20, 1992; *New York Times*, Dec. 19, 1991
[12]Limbaugh lays out his anti-environmental manifesto in *The Way Things Ought to Be* (New York: Pocket Books, 1992), especially in chapter 15: "Sorry, But the Earth is not Fragile," pp. 152-168; and, most recently, in *See, I Told You So* (New York: Pocket Books, 1993). Don Trent Jacobs analyzes Limbaugh's rhetoric in *The Bum's Rush: The Selling of Environmental Backlash* (Boise, ID: Legendary Publishing Company, 1994).
[13]For reactions to the Wise Use Movement from environmental groups, see: *Wilderness*, Spring 1993, Margaret Knox, "The World According to Cushman," pp. 28-36; *Audubon*, Sept.-Oct. 1992, Kate O'Callaghan, "Whose Agenda for America?," pp. 80-91; *National Parks*, March/April, 1993, Richard M. Stapleton, "A Call to Action," pp. 37-40; also, see Carl Deal, *The Greenpeace Guide to Anti-Environmental Organizations* (Berkeley, CA: Odonian Press, 1993).
[14]E. Calvin Beisner, *Prospects for Growth* (Westchester, Il: Crossway Books, 1990).
[15]The World Resources Institute, *World Resources 1994-95* (New York: Oxford Univ. Press, 1994).
[16]Lester R. Brown et al., *State of the World 1994* (New York: W.W. Norton, 1994); Worldwatch Institute also publishes a series of *Worldwatch Papers* dealing with specific issues.
[17]The World Bank, *World Development Report 1992: Development and the Environment* (New York: Oxford Univ. Press, 1992).
[18]Larry Burkett, *What Ever Happened to the American Dream* (Chicago: Moody Press, 1993).
[19]Larry Burkett, *The Coming Economic Earthquake* (Chicago: Moody Press, 1991).
[20]Larry Burkett, *What Ever Happened to the American Dream*, p. 131. This information is thoroughly refuted by the literature; see, for example, George W. Cox, *Conservation Biology*

(Dubuque IA: Wm.C. Brown, 1993) where pp. 138-142 clearly document the scientific work establishing DDT's harm to wildlife.

[21]Larry Burkett, *Whatever Happened to the American Dream*, p. 110.

[22]This is well-established information. See, e.g., Table 23.1 in The World Resources Institute, *World Resources 1994-95*, where CO_2 emissions from industrial processes are documented for every country in the world.

[23]*SCP Journal* 16:1, 1991, Brooks Alexander, "Gaia: Sects & Squabbles," pp. 8-9; Brooks Alexander, "Deep Ecology," pp. 10-17; Alison Lentini, "The Goddess Comes of Age," pp. 18-22; *Themelíos* 16:3, Steve Bishop, "Green Theology and Deep Ecology: New Age or New Creation?," pp. 8-14; *Themelíos* 18:3, Loren Wilkinson, "Gaia Spirituality: A Christian Critique," pp. 4-8.

[24]*Science* 155, 1967, Lynn White, Jr., "The Historical Roots of our Ecologic Crisis," pp. 1203-1206.

[25]See *Bioscience* 20, 1970, Richard T. Wright, "Responsibility for the Ecological Crisis," pp. 851-853, and Chapter 9 (Stewards of Creation) in Richard T. Wright, 1989, *Biology Through the Eyes of Faith* (San Francisco: Harper/Collins, 1989).

[26]*SCP Journal*, 1992, Michael Coffman and Brooks Alexander, "Eco-Religion and Cultural Change," pp. 15-23.

[27]See, for example, *Radix* 22:1, 1993, Shirley Palmer, "What Shall We Teach Our Children? Sex Education in Today's Schools," pp. 12-15, 28-29; and *World*, Dec. 11, 1993, Roy Maynard, "Non-sexual Revolution," pp. 10-13.

[28]A well-reasoned work on this issue by Susan Power Bratton (*Six Billion and More*, Louisville, Kentucky: Westminster/John Knox Press, 1992) gives an environmentally informed but Christian perspective on population issues.

[29]Larry Burkett, *World*, Sept. 4, 1993, p. 24.

[30]Rush Limbaugh, *The Way Things Ought To Be*, pp. 154 ff; Rogelio A. Maduro and Ralf Schauerhammer, *The Holes in the Ozone Scare: The Scientific Evidence That the Sky Isn't Falling* (Washington: 21st Century Science Associates, 1992).

[31]*Science 256*, 1992, Richard Stolarski et al., "Measured Trends in Stratospheric Ozone," pp. 342-349; *Science* 262, 1993, J. B. Kerr and C. T. McElroy, "Evidence for Large Upward Trends of Ultraviolet-B Radiation Linked to Ozone Depletion," pp. 1032-1034; see a discussion of this controversy in *Science* 260, 1993, F. Sherwood Rowland, "President's Lecture: The Need for Scientific Communication with the Public," pp. 1571-1576.

[32]See *Earth-Wise*, Calvin B. DeWitt, p. 29 (Grand Rapids, MI: CRC Publications, 1994).

[33]There is a rich literature in support of these views; see, for example, in *Perspectives on Science and Christian Faith* 46:2, 1994, articles by DeWitt and Bube, and a review of *Healing the Earth: A Theological Perspective on Environmental Problems and Their Solutions*, by Richard A. Young (Nashville, TN: Broadman and Holman Publishers, 1994).

[34]Beisner, *Prospects For Growth*, pp. 176-177.

[35]Ibid., pp. 164-165.

[36]Ibid., pp. 166-168.

[37]Ibid., p. 165.

[38]Fred Van Dyke addresses this concern in *Perspectives on Science and Christian Faith* 43, 1991,"Ecology and the Christian Mind: Christians and the Environment in a New Decade," pp.174-185.

Is Mankind the Measure?: Old Testament Perspectives on Mankind's Place in the Natural World

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In this paper I survey three areas: (1) what some prominent Old Testament theologians have said favorably about mankind's exalted role over the rest of creation, (2) recent accusations against evangelical Christianity for accepting and promoting an exalted view of mankind over creation, and (3) an examination of Gen. 1-2, Psalm 8, and especially Psalm 104, to demonstrate that while O. T. Scripture does give mankind an exalted position, this must be balanced with passages which place him on an egalitarian level *with the rest of the natural world (Ps. 104).*

In Psalm 104, I look at the interrelationship between the literary structure and themes of the poem which show that mankind is not *viewed as dominant over creation or as a* Lord over creation, *but on an equal level with the natural world. What is in question in Psalm 104 is not strictly mankind's relationship to the natural world but Yahweh's relationship to the natural world, especially to those chaotic elements in the natural world (water, heavenly bodies, darkness, and animal life). Yahweh exercises his kingly rule over creation, not through mankind's dominance, but through his direct rule and intervention of his Spirit. Therefore, if evangelicals have seen mankind's role as one of dominance over creation, it is because of a misunderstanding and misapplication of Scripture.*

Finally, in light of Psalm 104, I question whether we have read Genesis 1-2 and Psalm 8 properly, or whether there are other ways of reading these passages that promote a proper respect for a natural world.

Many have accused the Church of being the culprit for our environmental problems because she views mankind as superior over the rest of creation.[1] This superiority is supposedly based upon a Hebrew understanding of creation that, in the words of Harvey Cox, "separates nature from God and distinguishes man from nature."[2] One example of this superiority can be seen in the writings of Edmond Jacob. While Jacob does not represent the entire Church or speak for all theologians, I have chosen him as an example for those who would find evidence and accuse the Church of promoting the exploitation of the natural world.

Old Testament Scholar Edmond Jacob

For example, Edmond Jacob states concerning the relationship of mankind to the natural world:

> Affirmation of the unity of the world is already found heavily underlined in the Yahwist account of creation which refers all the works of creation to God their author on the one hand *and to man as their beneficiary on the other, for before the creation of man the earth was a desert* — it is drought and not water which constitutes the element of danger in this account — and *the garden of Eden was only planted to put there the man whom Yahweh formed before the*

> *other works of creation* (Gen. 2:8); what a commentator of a later period expressed in the words: "Thou wouldest make man the administrator of thy works, that it might be known that *he was by no means made on account of the world, but the world on account of him*" (Apoc. Baruch 14.18).[3]

One might not quibble with Jacob had he said that the "earth" is only ultimately temporary and not permanent but Jacob states that the "material universe" — not just the planet earth — is only temporary and does not possess permanent worth.

Because Israel existed in an environment of pagan religions, where the natural elements were exalted to divinity, the desire among some theologians is to avoid any deifying of nature, by downplaying the importance and value of the material world. Jacob states,

> *Man's superiority is shown in a general way over all nature.* In the oriental world as a whole, nature was deified and the presence of gods and spirits in its midst induced men to make them harmless by devoting a cult to them. In Hebrew religion there is no bond between man and nature. Thus salvation for man will not consist in the adoration of nature but in dominion over it; in a sense man looks upon it with the eyes of god, although of course that does not mean that he knows all its secrets; God alone possesses absolute wisdom: Prov. 8:22; Job 28:12ff.; 38.[5]

This type of theological thinking has the potential of promoting a devaluation of the natural world or a perception that the natural world is not good, perhaps even has ominous elements in it that need to be subdued, dominated, or controlled. The mandate to dominate the natural world comes from God's commands in Genesis 1:26-28 which tell mankind to "rule" and "subdue" the natural world. Jacob pictures mankind's rule over nature, and especially the ominous elements of nature, as mirroring Yahweh's triumph over primordial chaos and bringing it into subjugation. Jacob states:

> Domination through struggle reproduces God's own action: the earliest traditions about creation of which we have traces in certain poetic texts represent it as a struggle and victory of Yahweh's over the powers of chaos, which have not, however, been totally destroyed but only bridled.[6]

In other words, just as Yahweh struggled to dominate primordial chaos, so man struggles to dominate the natural world, especially the evil implicit in the animal world.

The Thesis of This Paper

What is at issue is how we perceive the natural world. Does the natural world exist mainly for the benefit of mankind, or does it have intrinsic value, or are both affirmed in Scripture? Does the Old Testament support a view of the natural world in which mankind is the measure or have we misread the Old Testament, especially Genesis 1 and 2? Is there evidence in the Old Testament for the intrinsic value and worth of the natural world apart from mankind that would provide a balance to the monarchical view represented by Jacob which sees the value of the natural world in serving mankind's utilitarian needs?

Whether the church has been rightly or wrongly criticized for contributing to environmental problems, I would argue that we have focused much attention on Gen. 1 and 2 for our understanding of creation to the neglect of the rest of Scripture.

In the remainder of my paper, I will comment briefly on Gen. 1-2, and then focus on Psalm 104 to show that while Old Testament Scriptures (especially in the early chapters of Genesis) do give mankind an exalted position in the natural world, this must be balanced with passages like Psalm 104 which place mankind on an *egalitarian* level with the natural world.

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The choice of the word *egalitarian* "to be equal" or "have equality" can be misleading, but it is hard to find another word or concept that conveys a sense of equity, justice, and respect between mankind and the natural world. Its choice must be qualified. By egalitarian, I do not wish to exclude any hierarchical relationships within the natural world, including mankind's obvious hierarchy over animal and plant life in intelligence, societal roles and functions, communication, etc. However, I will argue that any hierarchicalism must stop short of dominance and exploitation over the natural world. An egalitarian view also includes a regal and royal position for mankind among living beings (Gen. 1 and 2), but I will argue that the role is positive in essence, not negative. It is markedly personal, rather than impersonal. It does not allow the natural world to be perceived as the object of human whim and desire. The egalitarianism or "equality" I would advocate between mankind and the natural world is based upon their common sharing of the goodness of the Creator and participation in his world. It is in contrast to a "monarchical" view that sees mankind, primarily in light of Gen. 1 and 2, as the lords of creation and has been equated with technology, exploitation, and consumerism. Psalm 104 pictures mankind and the natural world in a symbiotic, dependent relationship with each other and their Creator. Their value and worth are not based upon their utilitarian purposes, but on their place in the cosmos that Yahweh has created.

Genesis 1 and 2

It is in Gen. 1 and 2 that most theologians find support for the monarchical view of mankind *over nature*. The lines of evidence which are usually adduced[7] and a response to each include the following:

(1) The Lord God pronounces the sixth day very good (*tob mĕ'ōd*, Gen. 1:31) while the first five days are only pronounced good (*ṭôb*). Therefore, Yahweh's evaluation of the sixth day, which includes mankind's creation, is the highest he gives.

In response, both mankind and the natural world partake of the divine commendation, "and he saw that it was good." There is nothing *inherently* evil in the natural world that puts mankind at odds with it so that it needs to be "subdued."

(2) Mankind is given "rule" (*rādāh*) over the fish, birds, livestock, and creatures that move along the ground (Gen. 1:26,28). He is also told to "subdue" (*kābaš*) the earth (Gen. 1:28).

In response, though mankind is given "rule" over the fish, birds, cattle, and creeping things, they are considered with mankind a "living soul/creature" (*nepeš hayyāh*). Both mankind and creatures partake of the same divine life. This is seen further in the Noahic covenant where Yahweh promises not to destroy the world again by water. Mankind is included in the "living creatures" (*nepeš hayyāh*) who will be spared from Yahweh's curse. From Gen. 2:15 and Adam's role as a caretaker and tiller of the garden, we know that he understands his relationship to creation not in the pejorative sense of "rule" or "subdue," but in the sense of "mastery" and "settle."[8] I translate the terms *rādāh* "rule" and *kābaš* "subdue" with "mastery" and "settle" respectively. This translation, I believe reflects a positive relationship between mankind and the natural world. The verb *'ābad*, "work," is used in Gen. 2:15 and Ps. 104:14 to describe man's "cultivation" or "tilling" of the soil. The verb *šamār*, "cultivate" is used elsewhere in the O. T. for "tending flocks" (Gen. 30:31) and "protecting Absalom" (2 Sam. 18:12).

(3) Mankind further demonstrates his monarchy over nature by "naming" (*qārā'*) the animals. This naming shows his right of mastery or responsibility for these animals.

In response, Adam, even given his position of "rule," has an intimate connection with the rest of creation, having been taken from the "earth" (*'ădāmāh*). He is responsible for both oversight of the creation and finding his physical essence being defined by it.

(4) Only mankind is said to have been made "*in* the image of God" (*ṣelem*). No other creature is given such an honorary description of its relationship to a deity.

In response, while Adam is made in the image of God, the preposition *beth* "in" can be understood as "*as* the image of God."[9] Adam is the visible representative of Yahweh's rule to the rest of creation. The "image" has to do with something physical and visible rather than the nonphysical, invisible attributes or qualities of God reflected in Adam. This shows both mankind's privileged position and his inherent responsibility to represent his Creator before the rest of creation.

I believe, therefore, that in Genesis 1 and 2 there is evidence for a balancing of the monarchical view of mankind's relationship over the natural world with an *egalitarian* view of joint participation. It is debatable whether an exclusively monarchical view

of mankind's position over the natural world is justified even within the early chapters of Genesis.

Psalm 104

I would like to focus on four specifics in Psalm 104, which I believe show that the Psalmist places the natural world on an *egalitarian* level with mankind. The four specifics are: (1) a literary similarity to other ancient Near Eastern hymns which exalt the natural world for its own sake as the creation of the deity; (2) the structure of the psalm that places both mankind and the animal world on an egalitarian level as workers for their daily sustenance; (3) wisdom influences within the psalm that celebrate the mystery and intricateness of the entire natural world, which includes mankind, but focuses on the fauna and flora of the natural world; (4) the relationship of Psalm 104 with Gen. 1 as an example of inner biblical exegesis of an earlier text, particularly the desire of the Psalmist to reflect on Gen. 1-2 to show the close connection between mankind and the earth with mankind as the cultivator and caretaker of the earth, not its subjugator.

Ancient Near Eastern Literary Similarities

The first specific is that many biblical scholars have found a great deal of literary similarity between Psalm 104 and the Egyptian Hymn to Aten.[10] Both hymns celebrate the natural world as the creation of deity. The Hymn to Aten was written in the Amarna period during the reign of Pharaoh Amunhotep IV (1400 B.C.). This Pharaoh's reform consisted of suppressing worship of the god Amun who had become attached to the ancient sun god Re, and to replace Amun-Re with Aten, the solar disc who was the universal creator god. Amunhotep IV (Amun is satisfied) changed his name to Akhenaten (the effective spirit of Aten). He also changed the capital city from Thebes to Akhetaten (Horizon of the Aten), that is, Amarna. Some historians hailed Akhenaten as the first monotheist.

The point I want to make is that both hymns are simply a celebration of the natural world in all its glory, especially its fauna and flora. Psalm 104 falls within an ancient Near Eastern literary *Gattung* that celebrates nature for its own intrinsic value and worth. Some parallels between Psalm 104 and the Hymn to Aten include:[11]

A. Both hymns mention the rise of the sun at daybreak. The hymn proclaims to the god Aten:

Hymn to Aten:
At daybreak, when you arise on the horizon
All the world, they do their work.[12]

The psalmist proclaims Yahweh who has set in place the regularity of the sun:

Psalm 104:22-23:
When the sun rises, they come home
and crouch in their dens.
Man then goes out to his work,
to his labor until the evening.

B. Each poet also interrupts his survey of creation to proclaim the wonders of creation and the god who created it:

Hymn to Aten:
How manifold it is, what you have made!
They are hidden from the face [of man].
O sole god, like whom there is no other!
You did create the world according to your desire
When you were alone.
How effective they are, your plans,
O lord of eternity!

Psalm 194:24:
How many are the things You have made, O Lord;
You have made them all with wisdom;
the earth is full of Your creations.

C. The sustenance of creation by each god is also elaborated:

Hymn to Aten:
You set every man in his place,
You supply their necessities:
Everyone has his food, and his time of life is reckoned.

Psalm 104:14-15:
You make the grass grow for the cattle,
and herbage for man's labor
that he may get food out of the earth—
wine that cheers the hearts of men,
oil that makes the face shine,
and bread that sustains man's life.

Psalm 104:27:
All of them look to You
to give them their food when it is due.

D. Both hymns also picture water flowing down the mountains:

Hymn to Aten:
For you have set a Nile in heaven,
That it may descend for them and make
waves upon the mountains.

Psalm 104:6, 10:
You made the deep cover the earth as a garment;
the waters stood above the mountains.
You made springs gush forth in torrents;
they make their way between the hills.

E. Both hymns begin with the mention of light; Aten with sunrise, Psalm 104 with Yahweh wrapping himself in light:

Hymn to Aten:
You appear beautifully on the horizon of heaven,
You living Aton, the beginning of life!

Psalm 104:1b-2a:
O LORD my God, you are very great;
you are clothed with splendor and majesty.
He wraps himself with light as with a garment;

F. Each mention the nighttime and a specific reference to lions that in Aten leave their dens at night, and in Psalm 104 "roar for prey," returning home at sunrise:

Hymn to Aten:
Every lion is come forth from his den;
All creeping things, they sting.
Darkness is a shroud, and the earth is in stillness,
For he who made them rests in his horizon.

Psalm 104:20-21:
The lions roar for their prey
and seek their food from God.
The sun rises, and they steal away;
they return and lie down in their dens.

G. Each hymn also speaks generally of beasts and birds, trees and plants, the sea and its life, and the ships that sail on it.

Hymn to Aten:
All beasts are content with their pasturage;
Trees and plants are flourishing.
The birds which fly from their nests,
Their wings are (stretched out) in praise to your ka.
All beasts spring upon their feet.
Whatever flies and alights,
They live when you have risen for them.
The ships are sailing north and south as well,
for every way is open at your appearance.
The fish in the river dart before your face;
Your rays are in the midst of the great green sea.

Psalm 104:11-14, 25-26:
They [springs] give water to all the beasts of the field;
the wild donkeys quench their thirst.
The birds of the air nest by the waters;
they sing among the branches.
He waters the mountains from his upper chambers;
the earth is satisfied by the fruit of his work.
He makes grass grow for the cattle,
and plants for man to cultivate
bringing forth food from the earth:

There is the sea, vast and spacious,
teeming with creatures beyond number,
living things both large and small.
There the ships go to and fro,
and the leviathan, which you
formed to frolic there.

Both hymns celebrate the universal presence of God in nature.

There are some differences. The Hymn to Aten never mentions the creation of the sun while Psalm 104 does. In the Hymn to Aten, darkness is the absence of the deity Aten, while in Psalm 104 it is the creation of Yahweh. The primordial light is equated with the heavenly bodies in the Hymn to Aten, while in Psalm 104 they are differentiated. In the Hymn to Aten, mankind's creation is depicted as semen growing in a woman, while Psalm 104 does not directly describe mankind's creation. Also, the intricacies of a chicken embryo are described in the Hymn to Aten, while Psalm 104 is not as detailed in its depiction of animal life.

The Structure of Psalm 104

The second specific is that the structure and outline[13] of Psalm 104 do not have mankind as the central focus in the two sections which mention mankind specifically. Psalm 104 can be outlined[14] with Yahweh's sovereignty over creation as the central focus. Yahweh is the king over the natural world and mankind is simply an illustration of the regularity of the natural world.

I. Yahweh, shows his sovereignty over creation by incorporating the natural world into his royal realm (1b-4).

II. Yahweh shows his sovereignty over the earth by covering the earth with water, subduing the chaotic waters, and using them to nourish His creation (5-18).

III. Yahweh shows his sovereignty over creation by appointing heavenly bodies to regulate the seasons and days of animals and mankind (19-23).

IV. The Psalmist praises Yahweh for his manifold works throughout the earth which reflect his wisdom (24).

V. Yahweh shows his sovereignty over creation by controlling the chaotic waters, filling the vast sea with life, and turning Leviathan into a playmate (25-26).

VI. Yahweh shows his sovereignty over creation by sustaining all life by his Spirit (27-30).

VII. The Psalmist praises Yahweh's majesty and calls for His glory to continue while Yahweh the king rejoices in His works (31-32).

VIII. The Psalmist vows to sing praises to the Lord of Creation all his life but calls for sinners to be consumed from the earth (33-35ab).

The first section which mentions mankind, verses 13-16, falls in the very center of the poem. Its central topic is Yahweh's sovereignty over the earth which he demonstrated by subduing the chaotic waters (no mention of him having created them!) and using them to nourish the earth. The second section which mentions mankind, verses 19-23, demonstrates Yahweh's sovereignty over creation by appointing heavenly bodies to regulate the seasons and days. The key word here is "for the seasons" (*lĕmô'ădîm*, verse 19). The rest of the section is a series of specific illustrations on how the sun and moon regulate the animal world and man. Key terms are used to express the regulation of the natural world by the moon and sun. The sun knows "its setting or going down" (*mĕbô'ô*, verse 19); darkness becomes "night" (*lāylāh*, verse 20a); all forest life roams under the cover of "night" (*lāylāh*, verse 20b); the sun "rises" (*tizraḥ*, verse 22) to mark the end of the day; man goes out to his work "until evening" (*'ădê-'āreb*, verse 23).

The specific illustration demonstrating the regulation of the moon and sun is the interplay between mankind and the lion. The lion hunts at night and rests in the day; mankind rests at night and "tills" the land in the day. Here man and animal are placed on an egalitarian level as workers from the natural world who illustrate how wonderfully the sun and moon regulate the cycle of time. The lion is said to "seek" its prey from God. The word for "seek" (*baqqēš*) is used 220 times in the O. T.[15] It assumes a personal identity for the subject and involves a conscious act with a specific goal in mind. In theological usage, God is the most frequent object of seeking. Figuratively, the verb can mean "to ask." What the Psalmist is picturing for us is that lions, who not only instinctively hunt their prey because they are predators, are also conscious of their Maker's provision of their daily sustenance.

It should not surprise us that the lion is described as having intelligence because Psalm 104 has features of wisdom literature. Wisdom literature attributes the origin of wisdom to the creation of the world (Isa. 40:19ff; Jer. 10:12; 51:15; Ps. 104:24; Job 28:23-27; 38:36ff.; Prov. 3:19), and in at least three passages "wisdom" is attributed to certain animals, clearly in the sense of innate intelligence (Prov. 6:6-8; Job 12:7-9; 30:24-28). In Prov. 6:6-8, "wisdom" is gained from the observation of nature. The sluggard is urged to "go to the ant" and learn its ways. In Job 12:7-9, Job replies to Zophar that all of creation can tell him that God does what he pleases in allowing affliction in a pious person's life. This is, of course, metaphorical language. Job 30:24-28 mentions four creatures who are small in stature but extremely wise: ants, badgers, locusts, and lizards. In Job 39:13-17, the ostrich is mentioned as a particular case from the animal world which is deprived of "wisdom" so that it forgets where it has laid its eggs.[16]

Wisdom Elements in Psalm 104

The third specific, just mentioned, is that Psalm 104 is a hymn which contains wisdom elements.[17] Whybray lists Ps. 37 and 49 as wholly wisdom psalms; Ps. 51, 90, 104, 107, and 111 as containing wisdom elements; and Ps. 19 and 119 as relating the concept of wisdom to the law. Besides the obvious mention of "wisdom" (*ḥōkmāh*) in verse 24, which is only mentioned in six other Psalms (Ps. 37:30; 49:4; 51:8; 90:12; 107:27; 111:10), there are other indications of wisdom influences. A wisdom psalm focuses on the intricacies of the world as we know it.[18] It is illustrated by the lists, the *onomastica* or *catalogues* of the fields of knowledge, which are found in the Wisdom of Solomon 7:18-20 and 1 King 5:13 (Eng. 4:33).[19] In these lists Solomon catalogs and focuses on the different fauna and flora to be found in the natural world.

But it goes beyond just cataloging the natural world. It seeks to uncover the underlying "order" and "mystery" of the natural world. "Wisdom" theology is firmly rooted in creation. Several texts place the origin of "wisdom" at the time of creation (Isa. 40:13ff; Jer. 10:12; 51:15; Ps. 104:24; Job 28:23-27; Prov. 3:9).

Von Rad states:

> The "wisdom" is intrinsic to the natural world and must, therefore, signify something like the "meaning" implanted by God in creation, the divine mystery of creation.[20]

Hermisson says this of Psalm 104:

> If Solomon made proverbs "from the cedar that is in Lebanon to the hyssop that grows out of the wall" (I Kings 5:13), one may find in the psalm the same assignment of beings to their local and temporal realms: the badger to the rocks, the stork to the cedar trees, the lion to the night, and man and his work to the day. Naturally, then, there is more here than the mere compilation of creatures and environments. The meaningfulness of such coordination becomes evident, too; in this world and its manifold spaces everything is well arranged ecologically. There is even more; everything fulfills its purpose in this world, as is shown especially by the statements about the beneficial effects of water from springs and from Yahweh's heavenly chambers.[21]

In Job 28, another wisdom poem, the idea of wisdom is that:

> Wisdom, the order given to the world by God, is the most precious thing of all. But while man has eventually found a way to all precious things, he does not find the way to the mystery of creation. Only God knows its place, for he has already been concerned with it at creation.[22]

Psalm 104, following the order of the six days of Gen. 1, concludes the fifth day with a summary statement that focuses on the wisdom of God to be found in all of creation. The Psalmist says in verse 24, "How many are your works, O LORD! In wisdom[23] you made them all; the earth is full of your creatures."

What is being celebrated in this hymn, especially due to its wisdom elements, is not the exaltation of one part of creation over another, but a panoramic survey and detailing of the multi-textured complexity and wonder of the natural world as the product of an Almighty Creator. Mankind is one color in this variegated tapestry. Mankind is not the center of attention and the focus of awe and wonder. Yahweh as the Lord of Creation is praised. Wisdom, which is found in creation, turns toward mankind and invites them to consider the natural world in all of its splendor. Psalm 104 and other Scripture must balance our theology of mankind and the natural world, and balance the emphasis of the early chapters of Genesis.

Psalm 104 and Genesis 1

The last specific has already been mentioned, but now can be discussed in depth. It is that Psalm 104 and Gen. 1 are related in that they discuss the natural world by following the poetical order of the six days of creation.[24] Psalm 104 is a later reflection and commentary on Gen. 1 and *perhaps* a correction of misconceptions that an Old Testament individual could derive from reading Gen. 1 and 2.[25] Therefore, Psalm 104 deliberately invites us to contemplate its reflection of Gen. 1 and 2. This reflection is seen not only in following the order of the six days of creation, but in three other ways: (1) sharing vocabulary unique only to Psalm 104 and Gen. 1 and 2; (2) sharing vocabulary, but not necessarily unique vocabulary; (3) using inner biblical exegesis or scribal glosses to connect the two texts closely (much like the homiletical commentary of Psalm 8 upon Gen. 1 and 2).

The similarities between Psalm 104 and Gen. 1 in following the order of the six days of creation are as follows:

(1) Both mention Leviathan and the Tanninim, but Leviathan is not primordial and ominous in Gen. 1, but only a member of the Tanninim.

(2) Both Leviathan and the Tanninim are mentioned late in their respective narratives, which underscores submission to God (Gen. 1).

(3) Both Gen. 1 and Psalm 104 begin with a creation of light and detail the six days of creation in the same order.[26]

> A firmament (Gen.1:6-8), rafters in the lofts of the water (Ps. 104:3-4).
>
> Dry land appears (Gen. 1:9-10), earth is established on its foundation (Ps. 104:5-9, 10-13).
>
> Vegetation sprouts (Gen. 1:11-13), springs that gush forth (Ps. 104:7-18).
>
> Making of sun, moon, and stars (Gen. 1:14-19), sun and moon as markings (Ps. 104:19).

Creation of animals and man in Gen. 1:20-30, no parallel in Ps. 104.

Fruits and plants assigned to man as food (Gen.1:29-30), Ps. 104 is a meditation on the dependence of all life on Yahweh.

There is a considerable amount of common vocabulary shared between Gen. 1 and Ps. 104. Particularly striking are the expressions "for the seasons" (*lĕmô 'ădîm*) found in the Old Testament only in Ps. 104:19 and Gen. 1:14 (in reference with the luminaries), and the old poetic form "beasts" of the earth (*ḥayĕto*), found in Ps. 104:11-12, 20 and Gen. 1:24 (*ḥayyôt*, Ps. 104:25). Apart from Ps. 104 and Gen. 1 *ḥayĕto* is attested only in poetry in the Old Testament (Ps. 50:10; 79:2; Isa. 56:9; Zeph. 2:14).

Other shared (but not unique) vocabulary between Psalm 104 and Gen. 1 is shown in the table below:

Shared Vocabulary	Comments
"deep" (*tĕhôm*): Gen. 1:2; Ps. 104:6	used in both contexts of the watery chaos which had to be subdued
"wind, spirit" (*ruah*): Gen. 1:2; Ps. 104:30	Yahweh's spirit is the one who energizes creation
"Tanninim/Leviathan" (*tannînim/liwāytān*): Gen. 1:21; Ps. 104:26	since Psalm 104 mentions "Leviathan" rather than the "Tanninim," the writer is interacting with views which see Leviathan as the tannim par excellence and an adversary of Yahweh
"to serve" (*'ābad*): Gen. 2:5, 15; 3:23; 4:2, 12 [verbs or infinitives] and Ps. 104:14, 23 [nouns]	used in both contexts of man's cultivation of the earth
"create" (*bārā*): Gen. 1:1, 21, 27; Ps. 104:30)	used in Psalm 104 of the life creating power of Yahweh
"face of the earth," (*pĕnê ha 'ădāmāh*): Gen. 6:7; 8:13; Ps. 104:30	recalling both the flood due to human pride and the Spirit's work over the "face of the earth"
"dust" (*'āpār*): Gen. 2:7; 3:9; Ps. 104:29	man is viewed as returning to the dust with the rest of the natural world and totally dependent upon Yahweh
"creatures which creep"[27] (*remes*): Gen. 1:24-26; Ps. 104:25	used in Psalm 104 to refer to all animal life on the earth, though found in a context dealing with aquatic life
"birds of the heavens" (*'ôp haš-šāmayim*): Gen. 1:26; Ps. 104:12	translated "birds of the air" and refers to birds which fly across the expanse of the sky above the earth (cf. Gen. 1:20).
"herbage, foliage" (*'ĕśeb*): Gen. 1:11-12, 29-30; Ps. 104:14	the plant life provided for food and for man's cultivation
"to the place [assigned for them]" (*'el-mĕqom*): Gen. 1:9; Ps. 104:8	to refer to Yahweh's subduing and confinement of the chaotic waters.

Psalm 104 and Inner Biblical Exegesis

Psalm 104 is an example of inner biblical exegesis where the writer is reflecting on the original intent of Gen. 1 and 2 and giving a homiletical commentary on these chapters. Michael Fishbane has researched the phenomenon of inner biblical exegesis and has settled on three means which are employed by biblical writers to distinguish between the received text and scribal annotations:[28] (1) a formal indication through technical terms in the Masoretic text; (2) comparison of parallel texts *within* the Masoretic text or *between* the text of the Masoretic text and its versions, that is, the Septuagint or the Samaritan Pentateuch; (3) redundant and disruptive features in the Masoretic text which are also explanatory in nature.

We have already mentioned two technical terms used only in Gen. 1 and Psalm 104 (*lĕmô'ădim*, "for the seasons" and *hayĕtô*, "beasts") which show the organic connection between the two texts. Also, the pattern of Psalm 104 following the order of the six days of Gen. 1 shows their connection. I believe we can also see redundant and disruptive features in the Masoretic text in the two sections which deal with mankind. In verse 14 we read, "He makes grow/spring up grass for cattle, and foliage for cultivation of man." The participle "grow/ spring up" (*maṣmîaḥ*) does double duty for the nouns "grass" and "foliage." Both nouns are followed by nouns introduced by the *lamed* preposition. The first *lamed* introduces the indirect object, "He makes grass spring up for cattle." The second *lamed* preposition introduces a purpose clause, "He makes foliage spring up for cultivation."

What appears to be a scribal gloss is the addition of *hā 'ādām* "of the man." It is an explanation of who is doing the cultivation, and is probably being glossed because of the occurrence of "man" (*'ādām*) in verse 23, "Man goes out to his work, to his cultivation until evening," and the occurrences of the verb and infinitive construct *'ābad* and *la'ăbōd* in Gen. 2:5, 15; 3:23; 4:2, 12. The editors of *Biblia Hebraica Stuttgartensia* concur with understanding *ha adam* as a transposition to verse 14.[29] This leads to my second observation of internal redundancies and disruptive features. In verse 23, we read, "Then man goes out to his work and to his cultivation until evening." The occurrence of "to his cultivation," (*wĕla'ăbōdātô*)\appears to be redundant after "to his work" (*lĕpā'ālô*). Yet it is was probably glossed again because of its occurrence in verse 14 and the accompanying use of the root *'abd* in the early chapters of Genesis. The 3 + 3 Hebrew meter found throughout the poem would also require adding "to his cultivation" (*wĕla'ăbōdātô*) to balance both colons. It is interesting that the Septuagint renders both verbs by the same Greek word "work" (*ergon*), the first by the neuter form, the second by the feminine form. They apparently failed to see much difference between the two verbs, except the first possibly being more general and generic and the second more specific.

The point I am making is that these two apparent scribal glosses show the desire of the scribe to bring Psalm 104 into conformity with Gen. 1 and 2, and to do so in the specific passages dealing with mankind. In both examples, the point of the scribe is to associate very closely the idea of the cultivation of the earth with mankind. When the scribe/Psalmist reflects upon Gen. 1 he reflects upon the passages which show mankind's nourishing of the earth and not his subjugation and rule. Or to put it another way, the psalmist views mankind's subjugation and rule over the earth in the same manner as Adam understood it: one of cultivating, nourishing, and tending.

Why the differences between the Psalm 104 and Gen. 1? I would like to suggest three reasons:

(1) Ps. 104 is portraying creation with a *Chaoskampf* "Battle with Chaos" motif, with God as king and warrior. It is following an Old Testament tradition which views creation as a time of Yahweh's struggle with primordial chaos, personified as water.[30] This is largely missing from Gen. 1.

(2) Psalm 104 is a Wisdom psalm where the point is to celebrate the natural world, while Gen. 1 is much more didactic and formulaic: The differences[31] between Gen. 1 and Psalm 104 are as follows:

Gen. 1	Psalm 104
Narrating a sequence.	No claim to a narrative sequence (although a parallel with the days of Gen. 1 is found).
Process of creation.	Panorama of creation didactic tone.
Not praise, but order is the concern.	Praise for wisdom of creation is the end point.
Creation is the end.	Creation is the starting point (to contemplate the wisdom of God).
Presence of #7 (God rests on the seventh day).	Absence of #7. (Unless one sees the number 7 in verses 28-30 in seven lines of concluding poetry celebrating God's providence (cf. Fullerton, p. 55 who sees the number seven in these verses).

(3) Psalm 104 is a homiletical reflection upon Gen. 1, which incorporates elements from Gen. 1, and seeks to focus on mankind's relationship to the earth.

Conclusion

The four points I have made about Psalm 104 placing mankind on an *egalitarian* level with the natural world are:

1. The common ancient Near Eastern literary genre which Psalm 104 shares with the Hymn to Aten, shows that the natural world is worth celebrating for its own intrinsic value and worth as the creation of the Deity.

2. The structure of Psalm 104 shows that Yahweh's rule over the natural world is the focus of the poem not mankind's rule. Mankind is found only in sections which illustrate the regularity of the heavenly bodies and the provision, which Yahweh has made to sustain all of the natural world. Mankind and the animals are co-workers for daily sustenance within the regularity of the natural world.

3. The wisdom elements in Psalm 104 show that the natural world has order and meaning placed in it from the time of creation, and that the natural world exists not only to provide for mankind, but also to invite mankind to ponder its wisdom and richness, especially its fauna and flora.

4. The relationship between Psalm 104 and Gen. 1 concerning structure, vocabulary, and inner biblical exegesis, shows a desire by the psalmist to reflect and concentrate on the close association between mankind and the cultivation of the earth. He has understood the Genesis mandate to "rule" and "subdue" not in an exploitative sense, but in a symbiotic relationship of "mastery" and "settling." Mankind are not just kings over creation, but servants who participate in creation by being caretakers of the earth.

It is my hope that this look at Psalm 104 will lead to a closer examination of our theology of creation and perhaps provide a balance between Scriptural affirmations of mankind's mandate to master the natural world and his responsibility to do so with humility and an ethic of caretaking. ✪

NOTES

[1]I am not arguing that this is the position of the historic Christian church or that most theologians would subscribe to this, only that the church has been accused of being part of the environmental problem and Jacob represents this thinking. For examples both pro and con on the relationship of the Church to environmental problems see Robin Attfield, "Christian Attitudes to Nature," *Journal of the History of Ideas* (1983):369-385; John Austin Baker, "Biblical Attitudes Toward Nature," In *Man and Nature*, Edited by Hugh Montefiore (London: Collins, 1975):87-109; Susan Bratton, "Christian Ecotheology and the Old Testament," *Religion and Environmental Crisis* 6 (1984):195-209; Calvin DeWitt, *The Environment and the Christian: What Can We Learn from the New Testament* (Grand Rapids: Baker Publishing Co.,1991); William Dumbrell, "Genesis 1-3, Ecology, and the Dominion of Man," *Crux* 21 (1985):16-26; Ron Elsdon, *Bent World*, (Downers Grove: Intervarsity Press, 1981); James McPherson, "Towards an Ecological Theology," *The Expository Times* 97 (1986):236-240; Carolyn Merchant, *The Death of Nature*, (San Francisco: Harper Collins Publishers, 1980):164-190; A.R. Peacocke, "On the 'Historical Roots of Our Ecological Crisis,'" in *Man and Nature* (1975):155-158; Francis Schaeffer, *Pollution and the Death of Man* (Wheaton:Tyndale House Publisher, 1970); Lynn White, "The Historic Roots of Our Ecologic Crisis," *Science Magazine*. March 10, 1967; Loren Wilkinson, "A Christian Ecology of Death: Biblical Imagery and the Ecologic Crisis," *Christian Scholars Review* 5 (1976):319-338 and *Earthkeeping in the 90's: Stewardship of Creation*, (Grand Rapids:Eerdmans Publishing Co., 1991):216-236.

[2]Harvey Cox, *The Secular City*, (New York: MacMillan, 1965):22.

[3]Edmond Jacob, *Theology of the Old Testament* (New York:Harper and Row, 1958):147.

[4]Jacob, p. 149.

[5]Ibid., p.153.

[6]Ibid., p.170.

[7]cf. Bernhard W. Anderson, "Creation and Ecology," *American Journal of Theology and Philosophy* 4 (1983): 14-30. Reprinted in *Creation in the Old Testament*, Edited by Bernhard W. Anderson (Philadelphia: Fortress Press, 1984):152-171, for a balanced perspective on mankind's role to the natural world in the early chapters of Genesis.

[8]These terms are pejorative outside the book of Genesis, but I argue they are positive terms within the early chapters of Genesis because of contextual considerations. For *kābâs* used pejoratively outside Genesis cf. Est. 7:8 "rape"; 2 Sam. 8:11 "subduing an enemy; for *rādāh* used pejoratively outside Genesis cf. Isa. 14:2 "rule over oppressors; Lev. 26:17 "rule over slaves." An example of a term used negatively in Genesis but positively outside the book is in Gen. 3:1 where the serpent is called "crafty" ('ārûm and its cognates). In the book of Proverbs the word is positive with the meaning of "prudent" (Proverbs 1:4, 8:5, 12; 12:23; 13:16; 14:8,15,18; 15:5; 19:25; 22:3; 27:12). It is applied to the "prudent" person who is seeking after God's wisdom.
Adam understands his role as a "caretaker." This can be seen from Gen. 2:15, where Adam is placed in the garden of Eden "to work it" (*'abad*) and "to take care of it" (*šāmar*). I follow the understanding of Rabbi Samson Hirsch (*The Pentateuch*, Judaica Press, 1982 pp. 29-32) in understanding *radah* not as "rule" but rather "mastery" over living creatures and *kabas* not as "subdue" but rather "acquiring," or "settling" referring to taking possession and settling property which is the prerequisite for familial and societal life. Because the earth only is in view with *kabas*, I prefer to translate it "settle." This fits the context of the first couple and their descendants spreading out to settle down throughout the earth.

[9]This is known as the *beth essentiae* with a translation such as "as, in the capacity of, consisting of." For a grammatical discussion see *Gesenius' Hebrew Grammar*, Oxford Press, 1978, section 119i.

[10]For further discussion see Peter Craigie, "The Comparison of Hebrew Poetry: Psalm 104 in the light of Egyptian and Ugaritic Poetry," *Semitics* 4 (1974):12-15; Jon Levenson, *Creation and the Persistence of Evil: The Jewish Drama of Divine Omnipotence* (San Francisco: Harper and Row, 1988):60-65; and R. J. Williams, "The Hymn to Aten," in *Documents from Old Testament Times* Edited by D. W. Thomas (London: Thomas Nelson and Sons, 1958):142-150.

[11]Craigie also notes the similarity of Psalm 104 to the Hymn to Shamash in Mesopotamia.

[12]The translations here follow James B. Pritchard, *Ancient Near Eastern Texts Related to the Old Testament* (Princeton, NJ: Princeton University Press, 1969):328-29, and Levenson, *Creation and the Persistence of Evil*:61-62.

[13]Leslie Allen, *Psalms 101-150*, from the *Word Biblical Commentary 21* (Waco: Word Books, Publisher, 1983):28-32; F. Crusemann, *Studien zur Formgeschichte von Hymnus und Danklied in Israel* WMANT 32. (Neukirchen-Vluyn: Neukirchener Verlag, 1969):195ff; K. Fullerton, "The Feeling for Form in Psalm 104," *Journal of Biblical Literature* 40 (1921):43-56.

[14]The outline is my own.

[15]*Theological Dictionary of the Old Testament*, s.v. "biqqēš" by Siegfried Wagner, II (1975):229-241.

[16]R.N. Whybray, *The Intellectual Tradition of the O.T.* BZAW 135. (Berlin: A. Topelmann, 1974):7.

[17]Bernhard Anderson, "Mythopoeic and Theological Dimensions of Biblical Faith," in *Creation in the Old Testament*. (Philadelphia: Fortress Press, 1984):13; Hans-Jurgen Hermisson, "Observations on the Creation Theology in Wisdom." In *Israelite Wisdom: Theological and Literary Essays in Honor of Samuel Terrien*. (Missoula: Scholars Press, 1978):47ff; Whybray, pp. 93-98; Gerhard von Rad, *Wisdom in Israel* (Nashville: Abingdon Press, 1972):144-176.

[18]The distinction of J.W. Rogerson, "The O.T. View of Nature: Some Preliminary Questions," *Oudtestamentische Studien* 20 (1977):69-70 between viewing nature in terms of its material world and collective objects rather than the regulative power underlying the observable phenomena of nature is made in this paper. The former belongs to nature while the latter belongs to the scientific or religious realm.

[19]Hermisson, p. 47; cf. von Rad, p. 288.

[20]von Rad, p.148.

[21]Hermisson, pp. 48-49.
[22]von Rad, p.148.
[23]cf. Prov. 3:19 and Job 28:25-27 which place this wisdom from the time of creation.
[24]John Day, *God's Conflict with the Dragon and the Sea: Echoes of a Canaanite Myth in the Old Testament* (Cambridge: Cambridge University Press, 1985):51; Derek Kidner, *Psalms 73-150: A Commentary on Books 3-5 of the Psalms* in *Tyndale Old Testament Commentaries* (London:Intervarsity Press, 1975):368; Levenson, pp. 55-58.
[25]Shemaryahu Talmon, "The Biblical Understanding of Creation and the Human Commitment," *Ex Auditu* 13 (1987):114ff, comments on this inner biblical human hubris within the early chapters of Genesis.
[26]Derek Kidner outlines the Psalm this way:
Day 1 (Gen. 1:3-5) light; Psalm 104:2a
Day 2 (Gen. 1:6-8) the 'firmament divides the waters; Ps. 104:2b-4
Day 3 (Gen. 1:9,10) land and water distinct; Ps. 104:5-9 (+10-13?)
Day 3 (Gen. 1:11-13) vegetation and trees; Ps. 104:14-17 (+18?)
Day 4 (Gen. 1:14-19) luminaries as timekeepers; Ps. 104:19-23 (+24)
Day 5 (Gen. 1:20-23) creatures of sea and air; Ps. 104:25,26 (sea only)
Day 6 (Gen. 1:24-28) animals and man (anticipated in Ps. 104:21-24)
Day 6 (Gen. 1:29-31) food appointed for all creatures; Ps. 104:27-28 (+29, 30)
See John Day, p. 51 for a comparison between Psalm 104 and Gen. 1. He lists the common order as:
Ps. 104:1-4 Creation of Heaven and Earth cf. Gen. 1:1-5
Ps. 104:5-9 Waters pushed back; cf. Gen. 1:6-10
Ps. 104:10-13 Waters put to beneficial use; Implicit in Gen. 1:6-10
Ps. 104:14-18 Creation of Vegetation cf. Gen. 1:11-12
Ps. 104:19-23 Creation of Luminaries cf. Gen. 1:14-18
Ps. 104:24-26 Creation of sea creatures cf. Gen. 1:20-22
Ps. 104:27-30 Creation of living creatures cf. Gen. 1:24-31
[27]Ps. 104:25 uses this word rather than *seret* "swarming creatures." Both of these words are used in parallel contexts in Genesis (8:17; 7:21, 23). It would seem, however, if the Psalmist was emphasizing the creatures associated with water only, he would have used *seret*, since it is associated with water in Gen. 1:20-21. Instead, he uses *remes*, which is always used with of creatures on the earth (Gen. 9:3), rather than the sea. Perhaps he chose *remes* because Gen. 9:3 uses it to refer to all animals inclusively or because of the earlier use of the verb *rāmaś* in verse 20.
[28]Michael Fishbane, *Biblical Interpretation in Ancient Israel.* (Oxford: Oxford University Press, 1985):42-43.
[29]*Biblia Hebraica Stuttgartensia*, edited by K. Elliger and W. Rudolph. (Stuttgart: Deutsche Bibelgessellschaft, 1967):1184, n.14a reads "*huc tr*," "transposed words to this place."
[30]For a discussion of the *Chaoskampf* motif in the Old Testament and ancient Near East see John Day, *God's Conflict with the Dragon and the Sea: Echoes of a Canaanite Myth in the Old Testament* and Carola Kloos, *Yhwh's Combat with the Sea: A Canaanite Tradition in the Religion of Ancient Israel.* (Leiden:E.J. Brill, 1986).
[31]Levenson, pp. 57-58.

Books Received and Available for Review

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Albert LaChance & John Carroll, *Embracing Earth: Catholic Approaches to Ecology*, Orbis, 1994
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Charles Raven, *Science, Religion, and the Future*, Morehouse Publishing, 1994
Evelyn Reed, *Sexism and Science*, Pathfinder, 1993
Harry Robin, *The Scientific Image: From Cave to Computer*, Freeman, 1993
Donald Wiebe, *Beyond Legitimation: Essays on the Problem of Religious Knowledge*, St. Martin's Press, 1994

Should We Be Concerned About People Who Do Not Yet Exist?

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To what degree, if any, should our current choices be constrained or motivated by their importance for future human beings? Our answer will be formative for choices in genetics, ecology, and other crucial areas. Arguments to benefit or at least not harm future human beings include love for one's own children and theirs, utility, love of neighbor, fear of God, self transcendence, and membership in the moral community of humanity. While concerns of autonomy, limited knowledge, and justice constrain what we can do for future generations, we can and should limit damage to their interests, and pursue improvement if this is done in a way which is incremental and reversible. Properly understood, concern for the interests of future human beings is one of our moral responsibilities.

There have always been human actions that affect future human beings, from choice of mate to large scale use of limited resources. As our technological capacities have increased, so has the impact of those choices. To what degree, if any, should our current choices be constrained or motivated by their importance for future generations? With that question in mind four points will be pursued. First, can the term "obligation" even be used regarding human beings who do not yet exist? Second, if it can be used in regard to future human beings, what arguments can be made that we should have concern for their interests? Third, what constrains responding to such concerns? Fourth, what then might be appropriate considerations when making choices that affect future generations? Our answer will be formative for choices in genetics, ecology, and other crucial areas.

Obligation and Future Status

Ethical systems usually include some degree of concern for the welfare of people, but does that include people in the future? J. Brenton Stearns argues that traditional social contract theory leads to a basic problem in this case, since future persons cannot make contracts or promises.[1] As R. B. Brandt observes, the historic paradigm of "obligation" has three requirements: a specifiable service is required of one person, two parties are involved — one to provide the service and one to receive it, and a prior transaction has created the promise.[2] One who does not exist cannot fulfill the criterion of making a promise. However, the term "obligation" may be used more broadly. For those who are not able to speak for themselves but who are recognized persons, such as children, obligations can be as clear as for those who can speak. The obligations may be even more clear due to the recipient's need for special protection. *Having* a claim does not require being able to *make* a claim.[3] Claims can exist without mutual agreement. Often the obligation of one human being to another is extensive whether claimed or not. When such obligations are required by a position such as that of a parent, they may be called "duties," but still exemplify this broader sense of obligation.[4] One may have obligations to people who have not made a reciprocal promise.

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While obligations to children who have not entered into an agreement are relatively familiar, obligations specifically to those who do not exist yet have not been as carefully addressed. Can obligations extend to future human beings? Galen Pletcher responds that some obligations may fall to unspecified persons.[5] One has an obligation to build adequate brakes in a car even if one does not know who will eventually drive it, and the eventual purchaser has a right to sound brakes even if he was not born when the car was manufactured. Pletcher calls this kind of obligation, "obligation-function." By this term he does not mean that it is less compelling than an obligation *simpliciter*, but that it is perfectly valid, although not yet necessarily assigned to a particular person.[6] One could say that people in the future should have clean air. If so, whoever now makes choices that affect air quality should consider that obligation. Even those, such as Macklin and De George, who specifically do not recognize "obligations" to future human beings, often argue for taking future needs into account. For this discussion, "obligation" is used without the sense of two already identifiably set particular parties that some authors assume.[7] It is enough to be considering positive goals that should be pursued for any human beings who are likely to follow, *whoever* in particular they may be.[8]

Arguments for Considering the Interests of Future Human Beings

There is widespread agreement that a great deal is owed to our children. What do we owe *their* children? Led by powerful commitments and motivations such as love and hope, people often make tremendous efforts on behalf of their own children. That intervention for their children has effects for the children of their children. Is there any obligation to them? John Passmore argues that one should act deliberately to benefit the descendants of one's children.[9] We do cherish people such as our children and the institutions that are important to us. While we cannot love that which we do not know, we do have a concern for some of these which we do know. If one cares for other people, one will also care for what happens to them after one's own death. Concern from personal love extends into the future. Your children will probably be most happy if their children are happy, as those children are likely to be most happy if their children are happy. Passmore calls the resulting connections "a chain of love" from the present on into future generations. His point is not an obligation that if "A" owes "B" and "B" owes "C," then "A" owes "C." The fate of generation "C" is close and important to the happiness of generation "B" and the fate of generation "B" is close and important to the happiness of generation "A." "A" should care for what happens to generation "C" because of what it means to generation "A's" children.

The progression continues, making a chain of love that even if not directly broken, still does gradually diminish over time. Human ignorance is great, capacity to change the future is limited, and unintended effects are often more influential than intended ones. Passmore suggests in this light that the best service for future generations is to create the best possible world now. Surrendering freedom now to secure future freedoms is not worth the immediate cost and is unlikely to actually succeed. Too much is unknown and the claims are too weak to sacrifice basic goods. However, this generation should be willing to forego some enjoyments to better secure the needs of the near future, when we can project with a higher degree of probability that the effort will be substantially beneficial. Love for people we do know and care for leads to concern and effort toward their future and beyond.

Passmore's chain of love calls for concern most directly for one's descendants. Is there a further case for obligation toward those who are not closely and directly related biologically? Eric D'Arcy argues for a duty of beneficence toward any human being under the following conditions. "A" has a duty of benefi-

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cence to do X for "P" when: (1) "P" is at risk of significant loss or damage (such as severe injury or death), (2) "A's" action is necessary to prevent this loss or damage, (3) "A's" action would probably prevent it, and (4) the benefit that "P" will probably gain outweighs the likely harm to "A."[10] James Childress adds a step between (3) and (4) that the likely harms to "A" are minimal, so that "A" would not be required, for example, to lose her life to save two other lives.[11] Such a duty would apply to whomever one could so affect. Many of our choices have such a potential affect on future human beings.

In Judaism, and even more so in the Christian tradition, such responsibility to serve others is often understood as part of the command to love one's neighbor as oneself.

For Jonathan Glover, one's obligation is to whoever follows.[12] Glover argues from the principle of equality that the worth of each individual calls for equal consideration regardless of where or when that person lives. As a utilitarian promoting the good for human beings, one should be concerned to aid and not harm others "even if one does not know their names." He cites the analogy of a bus with many passengers getting on and off. It would not be acceptable to leave a time bomb on the bus because one does not know the people who will be on board when the bomb explodes. One's place in time makes no more difference in the utilitarian calculus than one's place geographically. "The temporal location of future people and our comparative ignorance of their interests do not justify failing to treat their interests on a par with those of present people."[13] Harms should be avoided and recognized goods should be pursued for future generations.

Thomas Sieger Derr finds such a mandate within what is common to the world views of the western religious traditions.[14] Each refers to some idea of a covenant, as with Abraham, where individual choices have consequences for descendants as God interacts with children of the covenant on through the generations. Emphasis is placed on each generation fulfilling and carrying on that covenant. Also, history in western traditions is usually described in a linear sense. Despite the laments in Ecclesiastes that complain of endless empty repetition,[15] history is usually described not as a repeated cycle, but as having a beginning in creation, a consistent working of God within it, and a definite culmination followed by transformation. The future does not merely repeat the past, but can change and develop in substantially new ways. With that potential can come the responsibility to contribute to positive change.

In Judaism, and even more so in the Christian tradition, such responsibility to serve others is often understood as part of the command to love one's neighbor as oneself. An example of this tradition can be found in the work of Donald MacKay, who advocates that one should benefit one's neighbor—including neighbors in the future—with whatever tools are available.[16] He cites Luke 10, saying that when the command to love one's neighbor was affirmed, the question was immediately raised about who is included in the category of neighbor. Jesus' response is the story of the Good Samaritan, culminating with the conclusion that one's neighbor is whomever one can help. Therefore, neighbor love would extend to future generations to the degree one can help them effectively. To love one's neighbor means to seek the best for others as one is able, whoever the other may be racially, culturally, geographically, or temporally. Such intervention for MacKay does not lead to salvation, perfection, or a rescue from rebellious self sufficiency, yet human beings are responsible to God to improve life for one another rather than drift in complacency.[17]

For MacKay one should be motivated not only by love of neighbor, but also by "the fear of the Lord."

For MacKay one should be motivated not only by love of neighbor, but also by "the fear of the Lord." Sins of omission are as serious as sins of commission, sloth as dangerous as pride. In one of Jesus' parables, the steward who buried his talent rather than multiplying it was rebuked for his inaction. Knowledge and neighbor love bring responsibility. Human beings will be held accountable for what they have achieved compared with what they could have done for the service of others and the glory of God. For McKay, it is a duty for the responsible steward to plan and take action for future human beings.[18]

Ernest Partridge argues that it is in this generation's own self interest to have a concern for something beyond themselves.[19] Self transcendence is

necessary for psychological health. To care for nothing outside oneself leads to alienation, if not narcissism, which is psychologically impoverished. He argues as well from what he calls "the paradox of morality:" that each individual benefits in a community where concern for others prevails. When one lives solely for oneself, both that individual and the society are harmed. Out of self interest in psychological and community well-being, one should be concerned about others. Partridge nominates future human beings as an appropriate recipient for that concern beyond one's present self. One may better serve oneself psychologically and prudentially by acting upon concern for future human beings. He does not explain why the group one should serve outside oneself is a future one.

For Daniel Callahan, to exclude any human beings, present or future, from our moral community invites abuses such as those of slavery or other oppression.

For Daniel Callahan, to exclude any human beings, present or future, from our moral community invites abuses such as those of slavery or other oppression. He grants that "to state that we have moral obligations to the community of all human beings introduces its own problems. One of them turns on the practical impossibility of effectively discharging obligations to all human beings."[20] The problem is compounded if concern for future generations of human beings is included. Yet wherever or whenever human beings may live, they are still human beings. As human beings they warrant consideration if our actions can affect them.

Callahan then goes on to emphasize that our actions will affect future human beings. The very existence of future generations depends on the present generation. The present generation has a responsibility to them due to their biological dependency and their need as fellow human beings. Callahan argues as well that this biological link incurs a further obligation — as we have received from the past so we have an obligation to pass on to the future. He labels this obligation with the Japanese term *on*.[21] One repays the care received from one's parents by taking equal or better care of one's own children. With no exact correspondence in the English language, the term carries an idea of both gratitude and justice in passing on what the present has received in trust.

Arguments for acting on behalf of future generations have been made, then, from many perspectives including love for one's own children, utility, love of neighbor, fear of God, self transcendence, and membership in the moral community of humanity. However, not one of the above has been argued as an unqualified absolute. What else may counterbalance these claims or be distinctive about applying them to the future?

Three Major Constraints

(1) Do we have a right to make choices that affect future human beings?

Part of the difficulty of action or restraint on behalf of future generations is that members of society are making choices that have immense impact on future generations, but cannot consult the people of those generations. To choose wisely for them parallels the role of parent, but consciously acting for them would not be an instance of often rejected ethical paternalism. "Paternalism may be defined as a refusal to accept or to acquiesce in another's wishes, choices, and actions for that person's own benefit."[22] One can act on behalf of future generations, but it is not possible to override expressed wishes, choices, or actions of people who do not yet exist.

Since they do not yet exist, to what degree can there still be concern for their autonomy? "Autonomy simply means that a person acts freely and rationally out of her own life plan, however ill-defined. That this life plan is *her own* does not imply that she created it *de novo* or that it was not decisively influenced by various factors such as family and friends."[23] Autonomy need not mean an isolationist ideal of autonomous existence where it is best for the individual to make decisions alone without regard to community or tradition.[24] Out of respect for persons, whoever they may be, they should have choices rather than be predestined to a future designed by someone else. Our society places a high value on autonomy—people should be able to shape and lead lives that are as unrestricted as possible. This is a central foundation of Anglo-American law, which is in the Lockean tradition of respect for individual persons.[25] In what we pass on, it is not possible to honor the autonomy of future individuals by consulting with them as we act. However, it is possible to be concerned about their autonomy as an end state. Current choices should avoid limiting the level of autonomy they will one day possess.

It is not enough to hope for *Ex post facto* consent[26] or ratification of our actions.[27] Later approval is prob-

lematic in that the intervention cannot be undone and the recipient may be substantially influenced by the received environment. Aldous Huxley referred to an extreme form of this problem in *Brave New World*. "That is the secret of happiness and virtue—liking what you've got to do. All conditioning aims at that: making people like their unescapable social destiny."[28] In *Brave New World*, all choices for the next generation were made and set by the controllers. People were shaped to their role rather than shaping roles and environment to the needs and desires of people. Such a concentration of choice in the hands of a comparative few, even if widespread within that generation, could limit the self-determination of future generations.

Past generations have made countless choices for the good and ill of the present generation.... The choice is not whether this generation will shape the next or not, but to what degree and in what direction.

Does one generation have a right to make choices so influential for future generations? The European discussion has at times led to a clear "no." In an appeal to the French *patrimonie* or the German *Erbgut*, the collective environmental heritage of human beings must remain just as received. Mauron and Thevos give the example that one cannot tear down a Gothic chapel for one's own convenience.[29] We should not in any way change our given heritage. Yet, in one sense, the question of right to influence is inapplicable. "The human autonomy we are required to respect is not an absolute individual sovereignty. No one has created himself."[30] Past generations have made countless choices for the good and ill of the present generation. This generation's choices will unavoidably shape the world the next generation enters and how they are introduced to it.[31] The choice is not whether this generation will shape the next or not, but to what degree and in what direction. Medical intervention, which enables people with genetically based myopia, diabetes, retinoblastoma, and other diseases or disabilities to survive and bear more children, spreads those genetic propensities and diseases through the population.[32] Where we build our homes and cities shapes the environment to be inherited. The present generation could refuse to restrain or act deliberately on behalf of future generations, but it can escape neither its influence, nor the consequences of its inaction. By avoiding deliberate intervention a different heritage from what could have been is established. Some risks are avoided and others are retained.

Are there ways to protect the autonomy of future human beings? If our maintaining and shaping ourselves and the environment is incremental, no one generation would so change perception and experience as to determine all who follow. Over time one small initial change could lead to vast divergences, as Carol Tauer has projected from chaos theory,[33] but each ongoing, overlapping generation would have the opportunity to adjust before long range implications became set. By emphasizing the sustaining of the natural environment and limited change, such as the elimination of small pox, intervention could increase choice rather than narrow it. Future generations might then be even more able to adapt to their unique environment and perspective. Future choice could be increased by thoughtful intervention. The current generation would not need to master the impossible task of predicting and balancing all the preferences of future generations to a set vision.

Also, reversibility is a major concern for implementing change.[34] Future generations should not have to continue an earlier mistake. If environmental choices are incremental and reversible, future generations could restore a pattern that had been deleted or changed. It might be argued that some parts of our environment such as small pox have little chance of being helpful in any scenario. As finite beings considering a distant future, this may be more a case of lack of imagination than definitive judgment. Vigilant caution is in order. Out of autonomy concerns, what we pass on should not be predestined to one narrow vision.[35] On the contrary, we may be able in some ways to increase the autonomous choices of future generations.

(2) Do we really know what will help future human beings?

It can be argued that one's place in time should make a difference in utilitarian calculus precisely because as one goes further into the future the circumstances and desires of future generations become harder to predict. The increasing uncertainty makes the weight of such concerns of less importance. One cannot have an obligation to positively benefit remote future generations when one does not know what will benefit them.[36] Charles Frankel notes in particular the tendency of people under the different

circumstances of various decades to emphasize different values.[37] Choices of any given generation reflect more their temporary circumstances than future desires and needs.

Others have responded that while one does not know completely what will positively benefit future human beings to a considerable distance in time, one has a good idea what will harm them. The essential purpose would be to relieve burdens and in the process, as in the Hippocratic tradition of *primum non nocere*, first do no harm. Thomas Szasz has written skeptically about such a commitment in that, according to Szasz, often one person cannot be helped without hurting another.[38] He cites an example of prolonging the life of a patient who harms others, or correctly diagnosing a woman as psychotic to protect her husband, and then seeing her lose her freedom through involuntary commitment to a mental institution. While one cannot predict all the effects of one's actions, that does not lead to the conclusion that all choices are equally desirable, nor that random choice would be as positive in its net effect as deliberately selected choices. Szasz is assuming that life is a zero sum game with losers always in direct proportion to winners. Life may not always be a zero sum game. Even as far as it is, justice might sometimes come into play about who might appropriately bear which burdens. Conflict between general principles does not abrogate their claims. Nonmaleficence could still be an important consideration.

While it can be difficult to know exactly what will always be most beneficial to future generations, Callahan suggests that there is enough likely continuity to have a good idea at least of what would be likely to harm them. There is more ethical responsibility than merely the avoidance of harm, but that is at least a minimal place to start.[39] While we do not know the future situation and ideals, leaving future generations with as viable a start as possible is likely to be helpful to them.[40]

(3) Are not the needs of the present already all consuming without adding concern about future human beings?

How might the competing claims between needs of the present generation and future generations be justly balanced? Would current concerns always be of the highest priority so that any effort on behalf of future generations would be postponed indefinitely?[41] John Rawls suggests a thought experiment to discern fair warrants. Behind a "veil of ignorance" one would design a long term society, not knowing what generation one would live in. The intent of the "veil of ignorance" is in essence to lead people to count others as of equal worth with themselves. Each other person counts as much as oneself in such a calculation because by the rules of the thought experiment one does not know which one is oneself. By such criteria reasonable people might choose to expect each generation to restrain its use and further invest in some improvement for the future as long as it is at minimal cost to that generation. These savings would include that without sacrificing its own welfare, each generation would set aside some resources and pass on information and culture to start the next generation off a little better than it did.[42] Working from a standard of fairness between generations to balance needs and preferences, if each generation has equal weight, each generation would be expected to contribute "justified savings." From such a policy every generation would benefit but the first.[43] If the first generation's sacrifice is minimal it may not be too much to ask.

Appropriate Concerns for Future Human Beings

Considering the above discussion, we should limit further damage to what we have already received. Future generations should not start at a deficit of our creation. In the classic dictum of *primum non nocere*, first, do no harm. This would be the starting implication for the obligations of beneficence and justice that we have discussed, as well as take the above constraints seriously. Second, as we are able to, we should restore previous damage to what we have received in environment, genetics... That too would carry out beneficence and justice while minimizing dangers from ignorance or limiting autonomy. Third, attempts at improvement in carefully balanced systems such as human genetics or the environment would be appropriate only as the opportunities for them are clear. Such required clarity would recognize the immense interdependence of life, yet that it may not already be ideal. The elimination of small pox from the globe was an appropriate alteration of our environment. Intervention, in light of our evident limitations and autonomy concerns, would best be incremental and reversible over time. Concern for future human beings is not absolute, a trump card over present human needs or over other parts of creation, but future generations should be a considered part of our current reflection as we make choices that will deeply affect our society's children and theirs.

NOTES

[1]J. Brenton Stearns, "Ecology and the Indefinite Unborn," *The Monist* 56(1972): 613.
[2]R. B. Brandt, "The Concepts of Obligation and Duty," *Mind* 73:291(July 1965): 387.
[3]Carol A. Tauer, "Does Human Gene Therapy Raise New Ethical Questions?" *Human Gene Therapy* 1(1990): 414.
[4]Ibid., 387.
[5]Galen K. Pletcher, "The Rights of Future Generations," in *Responsibilities to Future Generations: Environmental Ethics*, ed. Ernest Partridge (Buffalo: Prometheus Books, 1981), 168.
[6]Ibid., 170.
[7]Further examples include: Martin P. Golding, "Obligations to Future Generations," *The Monist* 56(1972): 85-99 and several articles in Ernest Partridge, ed. *Responsibilities to Future Generations: Environmental Ethics* (Buffalo: Prometheus Books, 1981).
[8]Brandt, "Concepts of Obligation," 390-391.
[9]John Passmore, "Conservation," in *Responsibilities to Future Generations*, 54. For his complete argument see John Passmore, *Man's Responsibility for Nature* (New York: Scribner, 1974).
[10]Eric D'Arcy, *Human Acts: An Essay in their Moral Evaluation* (Oxford: Clarendon Press, 1963), 56-57.
[11]James F. Childress, *Who Should Decide? Paternalism in Health Care* (New York: Oxford University Press, 1982), 31, 50.
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An Evangelical Declaration on the Care of Creation

The earth is the Lord's, and the fullness thereof. —Psalm 24:1

As followers of Jesus Christ, committed to the full authority of the Scriptures, and aware of the ways we have degraded creation, we believe that biblical faith is essential to the solution of our ecological problems.

Because we worship and honor the Creator, we seek to cherish and care for the creation.

Because we have sinned, we have failed in our stewardship of creation. Therefore we repent of the way we have polluted, distorted, or destroyed so much of the Creator's work.

Because in Christ God has healed our alienation from God and extended to us the first fruits of the reconciliation of all things, we commit ourselves to working in the power of the Holy Spirit to share the Good News of Christ in word and deed, to work for the reconciliation of all people in Christ, and to extend Christ's healing to suffering creation.

Because we await the time when even the groaning creation will be restored to wholeness, we commit ourselves to work vigorously to protect and heal that creation for the honor and glory of the Creator — whom we know dimly through creation, but meet fully through Scripture and in Christ.

We and our children face a growing crisis in the health of the creation in which we are embedded, and through which, by God's grace, we are sustained. Yet we continue to degrade that creation.

These degradations of creation can be summed up as (1) land degradation; (2) deforestation; (3) species extinction; (4) water degradation; (5) global toxification; (6) the alteration of atmosphere; (7) human and cultural degradation.

Many of these degradations are signs that we are pressing against the finite limits God has set for creation. With continued population growth, these degradations will become more severe. Our responsibility is not only to bear and nurture children, but to nurture their home on earth. We respect the institution of marriage as the way God has given to insure thoughtful procreation of children and their nurture to the glory of God.

We recognize that human poverty is both a cause and a consequence of environmental degradation.

Many concerned people, convinced that environmental problems are more spiritual than technological, are exploring the world's ideologies and religions in search of non-Christian spiritual resources for the healing of the earth. As followers of Jesus Christ, we believe that the Bible calls us to respond in four ways:

First, God calls us to confess and repent of attitudes which devalue creation, and which twist or ignore biblical revelation to support our misuse of it. Forgetting that "the earth is the Lord's," we have often simply used creation and forgotten our responsibility to care for it.

Second, our actions and attitudes toward the earth need to proceed from the center of our faith, and be rooted in the fullness of God's revelation in Christ and the Scriptures. We resist both ideologies which would presume the Gospel has nothing to do with the care of non-human creation and also ideologies which would reduce the Gospel to nothing more than the care of that creation.

Third, we seek carefully to learn all that the Bible tells us about the Creator, creation, and the human task. In our life and words we declare that full good news for all creation which is still waiting "with eager longing for the revealing of the children of God." (Rom. 8:19)

Fourth, we seek to understand what creation reveals about God's divinity, sustaining presence, and everlasting power, and what creation teaches us of its God-given order and the principles by which it works.

Thus we call on all those who are committed to the truth of the Gospel of Jesus Christ to affirm the following principles of biblical faith, and to seek ways of living out these principles in our personal lives, our churches, and society.

The cosmos, in all its beauty, wildness, and life-giving bounty, is the work of our personal and loving Creator.

Our creating God is prior to and other than creation, yet intimately involved with it, upholding each thing in its freedom and all things in relationships of intricate complexity. God is **transcendent**, while lovingly sustaining each creature; and **immanent**, while wholly other than creation and not to be confused with it.

God the Creator is relational in very nature, revealed as three persons in One. Likewise, the creation which God intended is a symphony of individual creatures in harmonious relationship.

The Creator's concern is for all creatures. God declares all creation "good" (Gen. 1:31); promises care in a covenant

with all creatures (Gen. 9:9-17); delights in creatures which have no human apparent usefulness (Job 39-41); and wills, in Christ, "to reconcile all things to himself" (Col. 1:20).

Men, women, and children, have a unique responsibility to the Creator; at the same time we are **creatures**, shaped by the same processes and embedded in the same systems of physical, chemical, and biological interconnections which sustain other creatures.

Men, women, and children, created in God's image, also have a unique responsibility for creation. Our actions should both sustain creation's fruitfulness and preserve creation's powerful testimony to its Creator.

Our God-given, stewardly talents have often been warped from their intended purpose: that we know, name, keep and delight in God's creatures; that we nourish civilization in love, creativity and obedience to God; and that we offer creation and civilization back in praise to the Creator. We have ignored our creaturely limits and have used the earth with greed, rather than care.

The earthly result of human sin has been a perverted stewardship, a patchwork of garden and wasteland in which the waste is increasing. "There is no faithfulness, no love, no acknowledgment of God in the land... Because of this the land mourns, and all who live in it waste away" (Hosea 4:1, 3). Thus, one consequence of our misuse of the earth is an unjust denial of God's created bounty to other human beings, both now and in the future.

God's purpose in Christ is to heal and bring to wholeness not only persons but the entire created order. "For God was pleased to have all his fullness dwell in him, and through him to reconcile to himself all things, whether things on earth or things in heaven, by making peace through his blood shed on the cross" (Col. 1:19-20).

In Jesus Christ, believers are forgiven, transformed and brought into God's kingdom. "If anyone is in Christ, there is a new creation" (II Cor. 5:17). The presence of the kingdom of God is marked not only by renewed fellowship with God, but also by renewed harmony and justice between people, and by renewed harmony and justice between people and the rest of the created world. "You will go out in joy and be led forth in peace; the mountains and the hills will burst into song before you, and all the trees of the field will clap their hands" (Isa. 55:12).

We believe that in Christ there is hope, not only for men, women and children, but also for the rest of creation which is suffering from the consequences of human sin.

Therefore we call upon all Christians to reaffirm that all creation is God's; that God created it good; and that God is renewing it in Christ.

We encourage deeper reflection on the substantial biblical and theological teaching which speaks of God's work of redemption in terms of the renewal and completion of God's purpose in creation.

We seek a deeper reflection of the wonders of God's creation and the principles by which creation works. We also urge a careful consideration of how our corporate and individual actions respect and comply with God's ordinances for creation.

We encourage Christians to incorporate the extravagant creativity of God into their lives by increasing the nurturing role of beauty and the arts in their personal, ecclesiastical, and social patterns.

We urge individual Christians and churches to be centers of creation's care and renewal, both delighting in creation as God's gift, and enjoying it as God's provision, in ways which sustain and heal the damaged fabric of the creation which God has entrusted to us.

We recall Jesus' words that our lives do not consist in the abundance of our possessions, and therefore we urge followers of Jesus to resist the allure of wastefulness and over consumption by making personal lifestyle choices that express humility, forbearance, self restraint and frugality.

We call on all Christians to work for godly, just, and sustainable economies which reflect God's sovereign economy and enable men, women and children to flourish along with all the diversity of creation. We recognize that poverty forces people to degrade creation in order to survive; therefore we support the development of just, free economies which empower the poor and create abundance without diminishing creation's bounty.

We commit ourselves to work for responsible public policies which embody the principles of biblical stewardship of creation.

We invite Christians — individuals, congregations and organizations — to join with us in this evangelical declaration on the environment, becoming a covenant people in an ever-widening circle of biblical care for creation.

We call upon Christians to listen to and work with all those who are concerned about the healing of creation, with an eagerness both to learn from them and also to share with them our conviction that the God whom all people sense in creation (Acts 17:27) is known fully only in the Word made flesh in Christ the living God who made and sustains all things.

We make this declaration knowing that until Christ returns to reconcile all things, we are called to be faithful stewards of God's good garden, our earthly home.

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A Theory of Theistic Evolution as an Alternative to the Naturalistic Theory

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The author considers recent papers by Howard Van Till, Phillip Johnson, and Ian Thompson dealing with God's sovereignty and the origin and evolution of living organisms. He then presents a theory of theistic evolution as an alternative to the current naturalistic theory. He insists that the origin of new genetic information is the major unanswered question of a naturalistic theory and proposes an intelligent cause (God) as a continuing provider of new genetic information. He affirms the traditional statement of Christian theism that God is the author, sustainer, and finisher of all natural processes. His theory of theistic evolution is considered in regard to (a) a "God of the gaps" theology, (b) hypotheses of common ancestry and punctuated equilibrium, and (c) the direction of current research in molecular evolution.

In a recent exchange of views entitled "God and Evolution,"[1] Howard Van Till and Phillip Johnson have presented their views on that topic. Primary areas of disagreement between these two appear to be (1) whether Johnson's position approaches a "God of the gaps" theology, and (2) Van Till's conviction that the Creator has equipped his creation so that "molecules and organisms have in fact accomplished the changes envisioned in the macroevolutionary paradigm simply by employing their own resident capacities."[2] This is clearly a presupposition, but Van Till has chosen to refer to it as the "doctrine of Creation's functional integrity."[3] Van Till draws support for his thesis of functional integrity from writings of Basil and Augustine, early Christian theologians. It should be noted, however, that these theologians were writing from the standpoint of a very different understanding of living organisms. They accepted the spontaneous generation of life, a concept that was not fully disproven until the work of Pasteur in the nineteenth century. As will be noted subsequently, Peacocke and Polkinghorne also propose this same presupposition. Van Till does note that functional integrity of the creation does not entail reducing the Creator either to the remote God of deism or the unnecessary god of atheism.[4] He further clarifies his position by saying:

> ...every one of these processes and every connective pathway in the possibility space of viable creatures is itself a mindfully designed provision from a Creator possessing unfathomable intelligence.[5]

Is there really any great distinction between Van Till's "...mindfully designed provision from a Creator..." and Johnson's: "If God exists at all, he could create by whatever means he chooses..."?[6] There is certainly some difference, when we try to determine what is meant by a "God of the gaps theology" and Van Till's thesis of "Creation's functional integrity," points I shall subsequently consider in more detail. I view my own position as intermediate between that of Van Till and Johnson, and would hope that these individuals might be open to a proposal that clearly recognizes the necessity of a continuing role of a Creator.

I have previously considered some presuppositions of science as related to origins,[7] and at that time I proposed that *an intelligent cause was involved*

in cosmological and biological origins. I now wish to proceed from that presupposition and am proposing a theory of theistic evolution that I consider to be consistent with both Christian theism and modern scientific evidence. I hope to show that this view will in no way interfere or limit processes of scientific enquiry; nor will it limit those who want "to determine the causes of natural things from which effects regularly proceed as described by physical laws."[8] In a recent paper, Ian Thompson[9] has proposed that divine immanence and transcendence are involved as part of God's sovereignty over the physical laws of this world. He notes that traditional Christian theism has held that God is the author, sustainer, and finisher of all natural processes. In a book chapter entitled "The Character of Contemporary Natural Science," Van Till[10] refers to God's *governance* as an expression of God's sovereignty and notes that this governance is not amenable to scientific study. Van Till distinguishes between *behavior* and *governance* and notes: "We shall find one concept — behavior— to lie within the scientific domain, and the other— governance — to lie outside its boundary."[11] He indicates that categories of *physical properties, physical behavior,* and *formative history* lie within the scientific domain as components of *behavior.* A key consideration in this paper will be whether or not there is a clear distinction between *behavior* and *governance* as Van Till suggests and particularly whether, and to what degree, the *formative history* of life forms comes under *behavior* or *governance.*

The initial presupposition of Van Till quoted earlier closely resembles the position of two British scientist-theologians, Arthur Peacocke and John Polkinghorne. Peacocke states this principle of a built-in creative capacity of molecules as follows:

> This is the in-built creative potentiality of all-that-is, which we have now to see *as* God at work, continuously creating in and through the stuff of the world he had endowed with those very potentialities.[12]

Both Peacocke and Polkinghorne would regard themselves as theistic evolutionists, but consider the role of the Creator to lie more within the concept of *governance* as suggested by Van Till. I clearly differ from Van Till, Peacocke, and Polkinghorne in my evaluation of the scientific evidence related to their presupposition of "built-in creative capacity," when this presupposition is applied to living organisms. At the biological level, I find no convincing evidence that atoms or molecules spontaneously form into all the necessary building blocks (amino acids, purines, pyrimidines, sugars, etc.) of living organisms, nor that those building blocks have innate properties that would cause them to form the informational macromolecules that are essential to life.[13] Van Till[14] argues that if the Creator did not provide initially for all of these innate capacities, this world would be developmentally incomplete; that there would be gaps and deficiencies in his creation. I must disagree. Is not Van Till limiting God's omnipotence by insisting that he should implant all of these "resident capacities" at the time of creation? Surely, a Creator could have chosen to provide capacities for organismal development on a continuing time basis if he so willed. Is it not possible (and I believe theologically sound) to believe that the Creator chose *not* to place capacities for organismal development in atoms and molecules, and that the properties that have been observed in the laboratory are really the true capacities that the Creator chose to give these atoms and molecules? I also wonder if it is not God's province rather than man's intuition to decide whether such a world would be developmentally incomplete.

The primary informational molecule in living organisms is deoxyribonucleic acid (DNA). The nucleotide sequences in DNA may be transcribed into informational sequences in ribonucleic acid (RNA), and one particular type of RNA, messenger RNA, may be translated into amino acid sequences in protein molecules. Therefore we may speak of genetic information at the level of DNA, RNA, or proteins. At the level of proteins, the genetic information is

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evident in three-dimensional structures as they carry out their specific functions.

The major stumbling block for a naturalistic theory of evolution, one guided entirely by chance, is that it has failed completely to answer the most basic origin and developmental questions.

The major stumbling block for a naturalistic[15] theory of evolution, one guided entirely by chance, is that it has failed completely to answer the most basic origin and developmental questions. These begin with the origin of life problem: Which came first — RNA, DNA, or protein — and could they be formed spontaneously from some prebiotic molecules? Today, most origin of life theorists seem to favor RNA as the initial molecule since some RNA molecules (ribozymes) have been shown to catalyze certain reactions. Nevertheless, these catalytic activities are very limited in scope and no one has shown that ribozymes could be formed spontaneously. The second question is even more fundamental: Where does new genetic information come from? Probabilities of forming new genetic information spontaneously are calculated most readily at the level of protein enzymes. The complexity of a simple protein molecule (cytochrome c) with a sequence of 101 amino acids is such that the probability of obtaining that information by chance has been calculated by Yockey[16] to be of the order of 2×10^{-65}. Yet many hundreds of different protein molecules are required for the simplest living organisms. In regard to the chance hypothesis for the origin of genetic information, Kuppers notes:

> The expectation probability for the nucleotide sequence in the bacterial genome is thus so slight that not even the entire space of the universe would be enough to make the random synthesis of a bacterial genome probable.[17]

Even Richard Dawkins in his blind watchmaker thesis is forced to postulate repeated events of "a ration of luck" with probabilities of 10^{-20} in his proposals of "cumulative natural selection."[18] Although Dawkins insists such proposals are scientific, I would argue that his dependence on events of "luck" is not science, but is a matter of faith in chance, since the presumed success of these events is contrary to all of the laws of mathematical probability.

Although the above evidences against the validity of a fully naturalistic theory are cited, they apply equally to the presupposition of Van Till, Peacocke, and Polkinghorne. Any "in-built creative potentiality" would be dependent upon random collisions of atoms and molecules, acting fully in accordance with physical laws.

The genetic information for all living organisms could not have been supplied initially to the simplest one-celled organisms, since higher organisms have hundreds of times as much genetic information in their cells. Consequently, I propose the following as a theory of theistic evolution: *that in the history of the origin and development of living organisms, at various levels of organization, there has been a continuing provision of new genetic information by an intelligent cause.*

***I propose the following as a theory of theistic evolution:* that in the history of the origin and development of living organisms, at various levels of organization, there has been a continuing provision of new genetic information by an intelligent cause.**

For a theist, that intelligent cause is God. When I use the term genetic information, I include DNA coding sequences and DNA control regions for all types of proteins and the various types of RNA. One could speculate that this genetic information may have been provided to existing organisms (possibly in the form of a template?) utilizing the organismal machinery, or in other instances it could have been independent of those processes. The Creator might have chosen to carry this out by "royal edict" or "divine command," terms used by Van Till to describe the Creator's "mindfully designed provision."[19] At this point I would not wish to make the manner of introduction of new genetic information a component of the theory, nor would I wish to speculate how the Creator might have supplied the genetic information, the structures, and metabolic processes necessary for the first living cells. I would apply this view of theistic evolution to most of the evolutionary events that are often referred to as macroevolution and which appear to require *new* genetic information. These events would include the

development of organ systems (sight, hearing, means of locomotion, sonar detection (e.g., in bats), etc.), as well as the development of new organisms at various taxonomic levels (phyla, classes, etc.).

I would apply this view of theistic evolution to most of the evolutionary events that are often referred to as macroevolution and which appear to require* new *genetic information.

In accordance with the suggestions of Lewis[20] regarding the structure of theories, I list three postulates to my theory of theistic evolution:

1. That coding sequences of DNA need not be expressed immediately when the information is provided. They could remain dormant (repressed) for hundreds, thousands or possibly millions of years, with subsequent expression possibly, but not necessarily, being triggered by chance events (mutations, gene crossovers, gene conversions, etc.).

2. That genetic information for events generally termed as macroevolution might be supplied over either a short period of time or over a somewhat longer period of time with the possibility of initial repression of that information.

3. That genetic information once expressed might become dormant (repressed), only to be expressed again hundreds, thousands or possibly millions of years later.

Postulate 1 is proposed to consider possibilities for rapid diversification of species, particularly following various mass extinctions. Postulate 2 is proposed to provide for macroevolutionary events that might require a number of new genes and control factors; in these cases the expression of some of these genes would be of no value until all were expressed. In postulating possible repression of genes for extended periods, I am aware that these genes would need protective mechanisms (copy editing, repair enzymes, etc.) to prevent deleterious mutations prior to the time they were fully expressed. I would also note: (1) that my concept of genetic information would include not only DNA coding sequences, but also those DNA sequences adjacent to coding sequences, as well as those found elsewhere in the cellular genome, that are involved in regulating the expression or repression of coding sequences; and (2) that natural selection could play a significant role in the establishment of new genetic information throughout organisms of animal and plant kingdoms. The role of natural selection in my theory of theistic evolution will be discussed more in subsequent sections.

It should be noted that the naturalistic theory of evolution rejects by definition the possibility of an intelligent cause. Kerkut has listed seven postulates for a naturalistic theory of evolution as follows:

1. Non-living things gave rise to living material, i.e., spontaneous generation occurred.
2. Spontaneous generation occurred only once.
3. Viruses, bacteria, plants and animals are all interrelated.
4. The protozoa gave rise to the metazoa.
5. The various invertebrate phyla are interrelated.
6. The invertebrates gave rise to the vetebrates.
7. Within the vertebrates the fish gave rise to the amphibia, the amphibia to the reptiles, and reptiles to the birds and mammals.[21]

. . . my theory [of theistic evolution] would involve an intelligent cause in each of these macroevolutionary steps, if the evidence clearly supports the validity of proposed ancestral pathways.

Lewis[22] lists the postulates in a different manner, but covers many of the same basic points. Although Kerkut listed those postulates nearly thirty-five years ago, adequate verifying evidence for most of them has still not been supplied. This does not mean that the above postulates have all been proven to be false; it does mean that they have not been proven to be true. For postulate 1, I believe the evidence, apart from an intelligent cause is clearly lacking. For postulate 2, most investigators may believe that life began only once but there are many who consider the evidence inconclusive. For postulate 3, involving interrelationships of organisms, most would agree that there is some kind of relationship, but there would be disagreement regarding the nature of that relationship. Postulates 4 through 7 deal with proposed ancestral relationships for all organisms. With the many discontinuities in the paleontological record, verifying evidence in support of these last four pos-

tulates is variable; in some cases, it is fair, in others it is clearly lacking. I have tried to bring my theory of theistic evolution as nearly as possible into agreement with current scientific evidence. At the same time, I would note that my theory would involve an intelligent cause in each of these macroevolutionary steps, if the evidence clearly supports the validity of proposed ancestral pathways.

[My view of theistic evolution] provides a role for natural selection in the establishment of genetic changes in organisms.

In proposing the above view of theistic evolution, I would not mean in any way to limit God's sovereignty or governance of all His creation. I concur with Thompson's view that God is sovereign over all of the physical laws which scientists utilize in their day to day operations and in their scientific explanations, but would note as Thompson[23] does that there may be questions regarding the origin of certain biological structures that scientific investigation may never be able to answer. One notes the same type of reservation by Van Till when he says:

> But, one might ask, how can such "mindless" material processes function to bring about what appears to be the product of intelligent design? The point is, they are not really mindless at all. Rather, every one of these processes and every connective pathway in the possibility space of viable creatures is itself a mindfully designed provision from a Creator possessing unfathomable intelligence.[24]

It is clear from this quotation, that Van Till is rejecting the concept of "blind chance" as the directing force of naturalistic evolution, and imposing a requirement for *direction* by a Creator. My view of theistic evolution suggests a means by which that direction might be imposed by the Creator without "limiting those who want to determine the causes of natural things from which effects regularly proceed as described by physical laws."[25] Phillip Johnson is theologically correct when he notes:

> If God exists at all, He could create by whatever means he chooses, whether or not the choice pleases me, Van Till, or the rulers of evolutionary biology. Determination of the method that God actually employed should be left to unbiased scientific research.[26]

My view of theistic evolution is one which I believe God in his sovereignty *may* have chosen to express his will over nature and is a view that I believe agrees with the best results of modern research in molecular and evolutionary biology. It provides a role for natural selection in the establishment of genetic changes in organisms. Although some of these changes may be a consequence of chance events, my view rejects the possibility that *only* chance events are responsible for changes.

Theistic evolution and "new genetic information"

I have previously noted that genetic information included DNA coding sequences and the related control regions that provide the blueprints for sequences in the different types of RNA and in all types of proteins. The proteins include not only all of the protein enzymes and other structural proteins, but also receptor proteins, protein hormones, and especially proteins involved in the control of cell and organ development. The protein enzymes in turn, would be responsible for catalyzing all of the metabolic reactions of the cell including the synthesis of DNA, RNA, protein, and other cellular macromolecules. It would not be possible for me to define in precise terms what I mean by *new* genetic information, but I will try to define it in general terms and also to indicate some areas that I choose not to include. I have previously utilized the specific amino acid sequence in cytochrome c to illustrate that genetic information in structures of that size simply cannot be a consequence of chance events. Probabilities of 2×10^{-65} simply are beyond the realm of achieving by chance, especially when these events would have to be repeated in a very localized spatial volume. Cytochrome c is a relatively small protein (ca. 100 amino acids long) with essential three dimensional structural features that are fairly typical of proteins in general. Many proteins are much larger than cytochrome c. Although selecting a dividing line would be arbitrary, we might say that protein molecules with a complexity comparable to or greater than that of cytochrome c clearly would require an intelligent cause for their first appearance in living organisms.

At the same time, many protein families are known. These groups of similar proteins, often with similar functions, share certain structural and sequence similarities, although some portions of the molecules may be quite different. In some cases, these protein families may share only a certain domain within a larger three dimensional structure. Doolittle[27] has provided a good summary of protein families and superfamilies and has also discussed

the occurrence of repeating units of certain protein segments in different organisms. It is possible that some of these families may have originated with a single gene. Following gene duplication, there may have been modifications and transfer of gene segments from other DNA sources within the cell. At the present time, I would not choose to include the genetic information for each protein in these family groups as *new* genetic information, simply because we do not know the limits of possibilities for information transfer from external sources. Amabile-Cuevas and Chicurel[28] have reviewed various types of transfer of genetic information. They note particularly the transfers of plasmid DNA between bacteria by a process termed conjugation, and the transfer of genetic information between eukaryotic organisms (organisms with a cell nucleus), especially that type of transfer utilizing retroviruses as carriers of eukaryotic DNA.

Another area that I would be reluctant to include at present as new genetic information concerns some of the genes involved in the production of antibodies. When many higher organisms are exposed to a foreign substance (antigen) they are able to produce protein antibodies that recognize the three dimensional structure of the foreign material. Our understanding of this fascinating process is not sufficiently complete for me to suggest which genes, or portions of genes, might involve new genetic information.

There are also many peptides of varying lengths that have hormonal and other functions in various organisms. These are often produced in cells as longer protein molecules with the functional portion produced by specific proteolytic cleavage. Without examination of each of these on an individual basis, it would not be possible to say whether new genetic information was involved in their initial appearance in an organismal genome. I have recently reviewed the various means of both intraspecies and interspecies transfer of genetic information,[29] which explains why I wish to differentiate as clearly as possible between the *introduction of new genetic information* and the *transfer of genetic information*, whatever the source.

Theistic evolution and a "God of the gaps"

A major question that will clearly be raised regarding my view of theistic evolution is how it differs from a "God of the gaps" theology. Wright speaks of a "God of the gaps" theology as follows:

> When we make God responsible for those things that we currently cannot explain, the gaps in our explanations, we open up a line of reasoning that leads to a denial of God as soon as a natural explanation is found.[30]

This may indeed be true if one relegates the role of the Creator only to unexplained events, but as Wilcox notes:

> Anyone who is a fully biblical theist must consider ordinary processes controlled by natural law to be as completely and deliberately the wonderful acts of God as any miracle, equally contingent upon his free and unhindered will.[31]

Consequently, when one speaks of a Creator as having a continuing involvement in creation, not only in providing infusions of genetic information, but also as author, sustainer, and finisher of all natural processes, then surely any charge of a "God of the gaps" theology is avoided. Thompson[32] refers to a "God of the gaps" as a god who may have intervened from time to time and disrupted the natural order. I believe a key point in Thompson's expression of a "God of the gaps" theology is that this would interfere with the scientific study of natural events. If scientists could not depend on the reproducibility of natural law or natural science, then the process of scientific enquiry would certainly be disrupted.

I believe that the provision of genetic information would in no way interfere with the scientific study of natural events.

Although some may consider that providing new genetic information is a disruption of the natural order, I believe that the provision of genetic information would in no way interfere with the scientific study of natural events. My view differs only slightly from that of Van Till when he considers God's governance of natural events. His view of governance as providing direction would not cause a disruption of the natural order. In my proposal for the provision of new genetic information, I have suggested a means by which a Creator may have provided that direction. Hummel has outlined a number of scientific presuppositions that might be considered as nearly articles of faith by the scientific community. Two of these that I feel are pertinent to this discussion are listed as follows:

1. *Order in nature.* Nature has an underlying order, shown in patterns and regularities that can be discovered.
2. *Uniformity of nature.* The forces of nature are uniform throughout space and time.[33]

The second of these presuppositions should probably be qualified to note that it refers to uniformity of kind, but not necessarily uniformity in expression or amplitude. The postulate of an evolutionary molecular clock sought to present rates of evolutionary change of protein sequences as *uniform* or *clocklike.* I have recently reviewed that evidence and have shown clearly that rates of these changes are quite variable and are definitely not clocklike.[34]

Does my view of theistic evolution conflict with either of the two scientific presuppositions listed by Hummel? I believe that with the postulates that I have carefully considered and phrased, my expression of theistic evolution will not conflict with those two presuppositions. My view does conflict with the presupposition of naturalistic materialism "that everything, including origins, can be explained in terms of natural processes."[35] That statement, which has been phrased in different ways by different proponents of naturalistic materialism, remains at the heart of that philosophy. It is an element of belief that remains totally unproven. My view replaces that element of belief in *chance* alone with the element of belief in an *intelligent cause.* I see no limitation on the expression of an individual's scientific research for one who accepts the view of theistic evolution that I have proposed. I believe this to be true whether the field of research endeavor be evolutionary biology, taxonomy, paleontology or molecular biology. It is true that this view should cause these research scientists to carefully review and evaluate some of the hypotheses on which their experimentation is based, a point which I shall consider in more detail in a subsequent section.

My view replaces that element of belief in* chance *alone with the element of belief in an* intelligent *cause.

Phillip Johnson defines the "God of the gaps" problem as "when we point to a gap in current scientific knowledge, and attribute unexplained events to a divine cause."[36] He notes that a far better theological position "...is that God is responsible for all events, and not just those for which scientific explanations are currently lacking." I would agree and would insist that God's sovereignty extends to all of His creation, and not only to providing the *new genetic information* that I include in the theory of theistic evolution. Nevertheless, in order to propose an alternative theory of evolution that can be the subject of criticism and dialogue within the scientific community, I have chosen to select the provision of new genetic information as an arbitrary dividing line. All of the evidence that I have seen indicates that science will never provide a naturalistic answer to my question: What is the source of new genetic information?

Theistic evolution and common ancestry

I have previously discussed the meanings of the word "evolution,"[37] using the article by Keith Thomson[38] of Yale University as a primary guide. These meanings range from (a) *change over time* to (b) *relationships of organisms by descent through common ancestry* to (c) *a particular explanatory mechanism for the pattern and process of (a) and (b), such as natural selection.* Thomson notes that there is a factual basis for *change over time,* but that *descent through common ancestry is a hypothesis.* Nevertheless, descent through common ancestry of all organisms is a major component of the broad view of the general theory of evolution. It is such an important component because the theory presupposes the monophyletic origin of life (i.e., all life began with an original archetypal cell). Therefore all present living organisms have descended from that original living cell and must be related by lines of descent. John Wiester[39] has called attention to the extremes that some have gone to in tying these lines of descent together even when the evidence is clearly lacking. In the California Academy of Sciences exihibit at Golden Gate Museum in San Francisco, he noted that: "...museum curators have transformed inference into evidence and falsified the placement of fossils..."[40] This deception was carried out in order to make the data fit the *descent through common ancestry hypothesis.*

A monophyletic origin of life is a possible component, but is clearly not mandatory to my view of theistic evolution. Likewise, the role of ancestral descent (sometimes referred to as genealogical continuity) is not nearly as essential to my view of theistic evolution. Whenever the evidence for common ancestry is sound and is established by experimental observations, there is no problem in accepting the data. Where the evidence is lacking, there is no compelling need to postulate that *all* organisms will one day be linked by ancestral relationships. Scientists,

nevertheless, are free to postulate organismal relationships and to design and carry out investigations to confirm or disprove those hypotheses. It should be clear, however, that in my theory of theistic evolution, consideration of ancestral relationships would include the possibility of new genetic information provided by an intelligent cause.

. . . in my theory of theistic evolution, consideration of ancestral relationships would include the possibility of new genetic information provided by an intelligent cause.

The greatest difference between my view of theistic evolution and that of a completely naturalistic view of evolution lies in the understanding of the third meaning of evolution as a *particular explanatory mechanism*. The difference does not lie in the understanding of natural selection, because some role for natural selection is involved in both views, although a greater role would surely be postulated in the naturalisic view. Note that natural selection deals only with the establishment of new organisms, or with the disappearance of existing organisms. It does not provide a mechanism for formation of those organisms. Both the naturalistic view and my theistic views of evolution accept evidence for change by mutations, trinucleotide repeats, gene duplications, gene conversions, gene crossovers, gene transfer, etc., but the naturalistic view *demands* that these changes by *chance events* account for all of the evolutionary changes in the grand scheme of common ancestry. My theistic evolutionary view postulates that the mechanism for change for macroevolutionary events resides with an intelligent cause, and that the mechanism involves the introduction of new genetic information. In a subsequent section, I will consider the extent to which this new genetic information might be amenable to study.

Theistic evolution and punctuated equilibrium

The Darwinian view of evolution was one of tiny progressive changes, i.e., gradualism. Eldredge and Gould[41] made a sharp digression from that view when they proposed their theory of punctuated equilibrium in 1972. In this latter view, which is much more in accord with the paleontological record than the Darwinian view, evolution (change over time) has proceeded by sudden jumps interspersed with periods of minimal or no change (stasis). Eldredge and Gould noted that new life forms often appeared very suddenly in the geological record, with little or no evidence of transitional groups. It should be added, however, that in terms of paleontology, "suddenly" could be interpreted as meaning periods of thousands of years, or even up to a million years.

In postulating this view, Eldredge and Gould provide no satisfactory mechanism for formation of new life forms at the macroevolutionary level. They consider natural selection as the means by which new life forms are established. My view of theistic evolution would not contradict their proposal of punctuated equilibrium, but would add one possible explanation for the sudden appearance of new life forms when these new forms required new genetic information. Many lesser changes in life forms (speciation, etc.) might be accounted for by some of the newer concepts of gene transfer as well as the more traditional explanations (gene conversions, gene crossovers, gene duplications, mutations, etc.). These sudden appearances of new life forms have been particularly evident during periods immediately following the various mass extinctions in the earth's geological history.[42] I would consider natural selection to have played a significant role in establishing these new life forms only after they were produced.

Theistic evolution and the direction of current research in molecular evolution

There are several areas of research in the field of molecular evolution that I believe would be profitably redirected if one accepts my view of theistic evolution. A cardinal hypothesis of the naturalistic theory of evolution has been that the earliest living organisms must have been very simple. This simplicity requirement has been applied to structures of enzymes, morphological structures (membranes, intracellular organelles including ribosomes, etc.), and even to a simpler genetic code. An examination of data for living, simple organisms provides no indication for the validity of this hypothesis. The components required for translation of the genetic information from nucleic acids to protein are extremely complex in all organisms as I have noted previously.[43] The enzymes necessary for several other fundamental life processes are also very complex. This is equally true whether the process is photosynthesis which utilizes solar energy to drive the biosynthesis of organic compounds, or various types of chemosynthesis to utilize energy in various chemi-

cals (H_2S, etc.) for the same purpose. The complexity extends not only to the structure of the enzyme proteins, but also to these processes as well. In each case, it is not a single enzyme that is involved, but a whole sequence of coupled enzymes. Often the different enzymes are bound together in defined macromolecular protein structures. In a great many instances, coenzymes or prosthetic groups are intimately involved in addition to protein in the catalytic function of these complex enzymes. I conclude that the evidence, when examined closely, provides no support for the hypothesis that all aspects of life must have been simple in the beginning. The assumption that early living organisms must have been simple can and does, I believe, interfere with and delimit scientific innovation and perspective.

The assumption that early living organisms must have been simple can and does, I believe, interfere with and delimit scientific innovation and perspective.

In contrast, if my view of theistic evolution is considered, there is no need to postulate initial simplicity. An intelligent cause could have provided genetic information for whatever degree of complexity that was required by the organism. It would still be important to study comparative sequences of genes and their expressed proteins and of protein structural features throughout all organisms in any phylogenetic grouping. This would provide information regarding the taxonomic levels involved in the appearance of new genetic information. Although it would provide no clue as to the source of that information, it might give an indication of the complexity when that information was first noted. Amino acid sequences and three dimensional structures of many proteins (for example, cytochrome c and hemoglobin) have been studied very extensively, but comparable studies on the majority of proteins have not been carried out. With procedures for isolating genes available and techniques for rapid DNA sequencing now automated, additional information of this type is rapidly becoming more available. It should be noted that gene sequencing should be carried out even though the gene might not be expressed as a functioning protein. In recent papers on cytochrome c genes[44,45] and in a paper critiquing the molecular evolutionary clock hypothesis,[46] I have considered some of the potential problems of this type of study and the potential information to be derived.

If my view of theistic evolution is valid, then the entire research area of origin of life studies should be carefully reevaluated. One has only to read recent evaluations of origin of life research to see a need for new hypotheses and new types of studies in this field of endeavor.[47]

If my view of theistic evolution is valid, then the entire research area of origin of life studies should be carefully reevaluated.

There are clearly other areas of research that might be affected by a view of theistic evolution. One of the most intriguing areas of investigation and also one with tremendous potential for future study involves research on developmental genes and their expressed proteins. Processes of embryogenesis and differentiation are tremendously complex. Brun has this to say regarding the process of embryogenesis:

> The timing of embryogenesis is accomplished in at least two different ways. First there are specialized pace-maker genes that play an important role in making "decisions" — for example, deciding at what time in embryogenesis the limbs grow out. In addition, timing is also controlled by the hierarchical organization of the genome. Primary genes are activated first, and the resulting gene products turn on secondary regulatory genes later. As these are turned on, tertiary genes will become active, activating regulatory genes that are located even further down stream...[48]

One has only to read "The Making of a Fly" by Lawrence[49] to realize the marvelous complexity of the manner in which these genes, functioning as their expressed proteins, control the migration and positioning of cells in the developmental stages of an organism. At this point, it is clear that some of these genes are present and function in a broad variety of organisms; others are unique to much smaller groups. Many evolutionary changes noted in paleontology involve changes in morphology, and formation of morphologic structures are under the direction of developmental genes. It is possible that during these evolutionary changes, some developmental genes may be turned on (expressed), while others may be turned off (repressed). My theory would propose, however, that some new genetic information would be required as well to account for major morphologic evolutionary change. It is evident that additional studies of developmental genes should be a primary area for future research, and

would contribute much to our understanding of evolutionary processes.

Conclusion

I wish to make clear that my understanding of theistic evolution, like the naturalistic view of evolution, should be freely open to criticism. If my proposal proves to be clearly wrong, it should be rejected. If it needs modification to bring it more completely in accord with the facts of science, it should be modified. I present it as *a* Christian theistic view, not *the* Christian theistic view. I am aware that in presenting this view I may be opposing those who, in recent years, have spoken of a theistic view in such general and often scientifically vague terms that their views could never be subjected to scientific criticism. Since it is more specific and detailed, my view can surely be subject to criticism. My proposal of theistic evolution can also be considered partially as an answer to those philosophers, such as William Hasker, who insist that: "...the normal scientific response is to retain a hypothesis until a superior replacement hypothesis emerges."[50]

I also hope I have avoided the pitfalls that undermined the design argument of William Paley's Natural Theology in the nineteenth century. Brooke notes that Paley argued: "...that every part of every organism had been meticulously designed for its function..."[51] Or as Paley's Natural Theology is described by Wright: "There was no search for mechanisms that could explain how adaptations might have come about... Design and original creation answered all of the questions about origins and adaptations..."[52] My view of theistic evolution clearly encourages the search for mechanisms of change and avoids the claim "that every part of every organism is perfectly designed." I have carefully avoided the question of divine determinism by leaving many evolutionary changes, particularly those at the species level, to chance events. Some theistic philosophers of science (for example, Polkinghorne) have suggested that the Creator chose to self-limit his omnipotence by not interfering in random events (i.e., those due solely to chance). At the same time, God's sovereignty surely extends in some manner, to these events as well. I shall not comment on this further, except to note that my theory of theistic evolution leaves open the possibility in this regard of divine self-limitation.

My understanding of theistic evolution can be phrased in terms that should permit it to be included as an alternate view in chapters on the origin of life and on evolution in high school and college textbooks. The dominance of a completely naturalistic view of these topics in high school textbooks in the United States has recently been the subject of a critique by this author and others.[53]

There are clearly aspects of God's *governance* of His creation that I have not touched upon. As noted by Van Till, there are areas of evolution at the molecular level where the guiding hand of a Creator may be involved. As one compares lower and higher levels in any phylogenetic tree, the marked similarities in sequence structure for particular protein molecules (for example, cytochrome c) are clearly evident. It is true that each step in these pathways could be a consequence of one or more point mutations. But is there not also a need for guidance in the selection of viable pathways? The possibility seems remote that all of the dead ends have necessarily been selected by random mutational events, and lost because they are not viable. Is it not likely that Van Till is correct when he says: "...every one of these processes and every connective pathway in the possibility space of viable creatures is itself a mindfully designed provision from a Creator possessing unfathomable intelligence."[54] This is an area that is not included in my theory of theistic evolution, but is certainly worth considering as an aspect of God's *governance* in an overall Christian theistic view. It could also be true that the continuing provision of new genetic information by an intelligent cause could be far more extensive than my arbitrary dividing line would suggest. My intention in proposing this theory is to open up such possibilities for serious consideration and possible experimentation.

Acknowledgments

The author wishes to particularly acknowledge his debt to Charles Thaxton and the other participants of the 1988 Tacoma Conference, "Sources of Information Content in DNA." At that conference, my thinking was first directed to the necessity of postulating an *intelligent cause* for biological origins. From the standpoint of molecular biology, I am particularly indebted to the presentations and writings of Michael Denton (c.f., Proceedings of Tacoma Conference and note 13), and to the discussion of issues and to the calculations provided by Peter Rust (see note 13). I also appreciate the comments of various reviewers of earlier drafts of this manuscript.

NOTES

[1]Van Till, H. J., and Johnson, P. E. (1993). "God and Evolution: An Exchange." *First Things*, June/July: 32-41. For additional dialogue on this topic, readers are referred to the *Christian Scholar's Review*, XXI, (Sept. 1991).
[2]Van Till, H. J. op. cit., p. 34.
[3]Van Till, H. J. (1993). "Is Special Creationism a Heresy," *Christian Scholar's Rev.* XXII: 380-395.
[4]Van Till, H. J. op. cit., p. 393.
[5]Van Till, H. J. see note 1, p. 38.
[6]Johnson, P. E. op. cit. p. 39.
[7]Mills, G. C. (1990). "Presuppositions of Science as Related to Origins." *Perspectives on Science and Christian Faith*, 42: 155-161.
[8]Thompson, I. J. (1993). "The Consistency of Physical Law with Divine Immanence." *Science & Christian Belief*, 5: 19-36; p. 19.
[9]Thompson, I. J. op. cit.
[10]Van Till, H. J. "The Character of Contemporary Natural Science." in *Portraits of Creation*, by Van Till, H. J., Snow, R. E., Stek, J. H., and Young, D. A. (1990). Eerdmans Publ., Grand Rapids, MI, pp. 126-165.
[11]Van Till, H. J. op. cit., p. 133.
[12]*Peacocke, A. (1991).* "God's Action in the Real World." *Zygon*, 26: 455-476, p. 464.
[13]The following are cited as summarizing the present status of origin of life research; Thaxton, C. B., Bradley, W. L., and Olsen, R. L. (1992). *The Mystery of Life's Origin: Reassessing Current Theories.* Lewis & Stanley, Dallas, TX (second printing); Shapiro, R. (1986). *Origins: A Skeptic's Guide to the Creation of Life on Earth.* Summit Books, New York, NY; Dose, K. (1988). "The Origin of Life: More Questions than Answers." *Interdiscipl. Sci. Rev.*, 13: 348-356. I believe that the suggestion that material processes in themselves might have the resident capacity to carry out the events envisioned in the macroevolutionary paradigm is contrary to the scientific evidence. As I and others have indicated elsewhere (c.f., Rust, P. (1992). "How has Life and its Diversity Been Produced?" *Perspectives on Science and Christian Faith*, 44: 80-94), and Denton, M. (1985). *Evolution: A Theory in Crisis.* Adler & Adler, Bethesda, MD), origin of life and macroevolutionary events are beyond the capacity of material processes governed only by chance.
[14]Van Till, H. J., see note 3, p. 384.
[15]In this paper I use the term "naturalistic" in the broad sense indicated by Van Till (see note 1 above); i.e., a naturalistic view of evolution is one guided entirely by chance events. This view is sometimes referred to as metaphysical naturalism or naturalistic materialism.
[16]Yockey, H. P. (1977). "A Calculation of the Probability of Spontaneous Biogenesis by Information Theory." *J. Theor. Biol.*, 67:377-398.
[17]Kuppers, B. O. (1990). *Information and the Origin of Life.* MIT Press, Cambridge, MA, p. 60.
[18]Dawkins, R. (1986). *The Blind Watchmaker.* W.W. Norton Co., New York, NY.
[19]Van Till, H. J., see note 3.
[20]Lewis, R.W. (1990). "Theories, Speculation, and the Structure of Knowledge." *Speculations Sci. Technol.*, 13: 13-17.
[21]Kerkut, G. A. *Implications of Evolution.* Pergamon Press, 1960, pp. 6, 7.
[22]Lewis, R. W. (1986). "Teaching the Theories of Evolution." *Amer. Biol. Teacher*, 48: 344-347.
[23]Thompson, I. J., see note 8.
[24]Van Till, H. J., see note 1, p. 38.
[25]Thompson, I. J., see note 8.
[26]Johnson, P. E., see note 6.
[27]Doolittle, R. F. (1989). "Redundancies in Protein Sequences." In *Prediction of Protein Structure and the Principles of Protein Conformation*, Plenum Press, New York, Fasman, G. D., editor, pp. 599-623.
[28]Amabile-Cuevas, C. F. and Chicurel, M. E. (1993). "Horizontal Gene Transfer." *Amer. Scientist*, 81: 332-341.
[29]Mills, G. C. (1994). "The Molecular Evolutionary Clock: A Critique." *Perspectives on Science and Christian Faith*, 46: 159-168.
[30]Wright, R. T. (1989). *Biology Through the Eyes of Faith.* Harper & Row, New York, NY, p. 85.
[31]Wilcox, D., as quoted in Wright, R. T., op. cit., p. 110.
[32]Thompson, I. J., see note 8.
[33]Hummel, C. (1986). *The Galileo Connection*, Intervarsity Press, Downers Grove, IL, p. 158.
[34]Mills, G. C., see note 29.
[35]Mills, G. C., see note 7.
[36]Johnson, P. (1993). "Creator or Blind Watchmaker?" *First Things*, January, 8-14, p.14.
[37]Mills, G. C., Lancaster, M., and Bradley, W. L. (1993). "Origin of Life and Evolution in Biology Textbooks — A Critique." *Amer. Biol. Teacher*, 55: 78-83.
[38]Thomson, K. (1982). "The Meanings of Evolution." *Amer. Scientist* 70: 529-531.
[39]Wiester, J. (1992). "How Science Works: The Views of Gingerich and Johnson.," *Perspectives on Science and Christian Faith*, 44: 249-252.
[40]Wiester, J., op. cit., p. 251.
[41]Eldredge, N. and Gould, S. J. (1972). "Punctuated Equilibrium, an Alternative to Phyletic Gradualism." *Models in Paleobiology*, Schopf, T. J. M. (ed.), Freeman Cooper & Co., San Francisco, CA, pp. 82-115.
[42]Ward, P. W. (1992). *On Methuselah's Trail: Living Fossils and the Great Extinctions.* W. H. Freeman Co., New York.
[43]Mills, G. C. (1991). "The Role of the Components of the Translation System in Information Transfer." Proceedings of the 1988 Tacoma Conference, *Sources of Information Content of DNA*, pp. 1-26.
[44]Mills, G. C. (1991). "Cytochrome c: Gene Structure, Homology and Ancestral Relationships." *J. Theor. Biol.*, 152: 177-190.
[45]Mills, G. C. (1992). "Structure of Cytochrome c and c-like Genes: Significance for the Modification and Origin of Genes." *Perspectives on Science and Christian Faith*, 44: 236-245.
[46]Mills, G. C., see note 29.
[47]Thaxton, C. B., et al, Shapiro, R. and Dose, K., see note 13.
[48]Brun, R. B. (1993). "Principles of Morphogenesis in Embryonic Development, Music and Evolution." *Communio*, 20: 528-543, p. 530.
[49]Lawrence, P. A. (1992). *The Making of a Fly: The Genetics of Animal Design*, Blackwell Scientific Publ., Cambridge, MA.
[50]Hasker, W. (1992). "Evolution and Alvin Plantinga." *Perspectives on Science and Christian Faith*, 44: 150-162, p. 155. I believe this philosophic view of Hasker is clearly in error, as my many years as an experimental scientist have exposed me to many scientific theories that have been rejected with no new theory to replace them.
[51]Brooke, J. H. (1991). *Science and Religion.* Cambridge Univ. Press, Cambridge, England, p. 192.
[52]Wright, R.T. see note 30, p. 53.
[53]Mills, G. C., et al., see note 37.
[54]Van Till, H. J., see note 5.

ESSAY REVIEW

Special Creationism in Designer Clothing: A Response to *The Creation Hypothesis*

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The Creation Hypothesis: Scientific Evidence for an Intelligent Designer, *J. P. Moreland, Ed., (Downers Grove, IL: InterVarsity Press, 1994) 335 pp., including notes, no index, $12.99. Paper.*

Enter "theistic science"

In his extended introduction to this collection of essays, editor J. P. Moreland, a professor of philosophy, places the goals of its contributors on solid ground: "Christians have a special intellectual and moral obligation to follow Augustine's advice: we have a duty, he said, to show that our Scriptures do not contradict what we have reason to believe from reliable sources outside them. In short, Christians have the obligation and privilege of developing and propagating an integrated Christian world view"(11). All Christians would, I presume, agree with that general goal.

But Moreland et al. have a much more specific goal as well: to define and defend what they, following philosopher Alvin Plantinga, wish to call "theistic science," a research program that is "rooted in the idea that Christians ought to consult all they know or have reason to believe in forming and testing hypotheses, explaining things in science and evaluating the plausibility of various hypotheses, and among the things they should consult are propositions of theology (and philosophy)"(12, 13). On the character and propriety of "theistic science," there is substantial disagreement among Christians.

To understand and evaluate this research program we must know its two central propositions: (1) "God, conceived of as a personal, transcendent agent of great power and intelligence, has through direct, primary agent causation and indirect, secondary causation created and designed the world for a purpose *and has directly intervened in the course of its development at various times (including prehistory, history prior to the arrival of human beings),*" and (2) "The commitment expressed in proposition 1 can appropriately enter into the very fabric of the practice of *science* and the utilization of *scientific* methodology"(13, emphasis added).

It soon becomes clear that the first proposition commits "theistic science" to some version of the *special creationist* picture of God's creative activity—that, in time, God's *creative* work was manifested as "direct, discontinuous, miraculous actions"(13). As I understand it, these inferred creative miracles, although performed without human observers and not explicitly called miracles in the Bible, would nonetheless be placed in the same category as the many revelatory and redemptive acts of God experienced by human observers and explicitly recounted as miracles in Scripture.

According to Moreland, "theistic science" is not one narrowly defined position but a research program that "is consistent with a number of different theories that specify it — for example, progressive creationist models, young-earth creation-science and other models"(13). Nonetheless, it is clear throughout the book that some portraits of God's creative work that are commonly found within the larger Christian community (and within the ASA) would not be welcome under the umbrella of "theistic science" — like "theistic evolution" or "evolutionary creation," for instance.

What is wrong with evolutionary creation?

Because those last two terms have a spectrum of meanings, and because the perspective of this reviewer greatly affects the stance of this essay review, I must clarify what I mean by "evolutionary creation." By that term I mean a concept of the Creator and the creation that includes the following propositions:

(1) That God, as presented in the Scriptures, and as the only and omnipotent Creator, is the sole source of both the existence and the capacities (for example, what matter and material systems can do) of the entire universe.

(2) That from the beginning, when the creation was brought into being from nothing, God has generously gifted the basic entities (for example, physical and biological systems) of that creation with all of the capacities that they would need to actualize, in time, all of the physical structures and living creatures that have ever existed. In other words, the functional and developmental economies of the creation are complete, not marked by any gaps that God would be obliged to bridge in time by extraordinary interventions.

(3) That the formative history of the creation does not occur independently of God's action, but is continuously dependent on God's action of sustaining and blessing. Therefore, the creation's entire formative history must be viewed as a manifestation of God's intentions, that is, God's "design" for what the creation, by employing its generously given capacities, would become in time. This *design perspective* does not in any way, however, bind God to achieve his intentions (designs) by acts of manipulation or coercion of created materials or beings.

(4) That the creation, though gifted by God with a gapless developmental economy (not missing any capacities that would be needed to realize the historical formation of all structures and life-forms) is always open to God's action in it and to God's interaction with it. Therefore, there is here no questioning of God's power or freedom to act in or interact with the creation; the question here is: *What is the character of the created world in which God acts and with which God interacts?* Does it have, by God's generosity, a gapless economy, or is its economy marked by gaps or deficiencies that need to be bridged by special acts of God in time, acts in which God manipulates or coerces matter to assume structures or life-forms that it was not earlier equipped by God to actualize? (Note: In this view miracles are acts freely performed by God for their timely revelatory or redemptive value, not obligatory acts needed to compensate for earlier omissions.)

(5) The scientific methodology that follows from this view of the created world is one that assumes the functional and developmental integrity of all physical and biological systems. The pejorative label "methodological naturalism" (to be discussed later) is, therefore, entirely inappropriate. The methodological strategies associated with this perspective are not derived from philosophical naturalism, which takes both the existence and the astounding capacities of the universe as brute givens requiring no further explanation. Its methodology is based instead on the presumption that the universe is God's creation and that he has generously gifted it from the beginning with a functionally and developmentally complete economy. A broad spectrum of physical structures and life-forms would be realized in time without the need for extraordinary divine interventions to compensate for earlier omissions.

(6) This *evolutionary creation* perspective is, in its basic approach, entirely consistent with the reading of Genesis encouraged by Basil and Augustine sixteen centuries ago. These two stalwarts of early Christian theology rejected the idea that God performed special creative acts in time and they promoted instead the concept of a creation gifted with complete functional and developmental economies from the very beginning.[1] There is, however, one noteworthy difference of detail. Where Basil and Augustine employed the prevailing concept of spontaneous generation for each kind of life-form, a concept no longer considered scientifically credible, this evolutionary creation view employs the concepts of genealogical continuity and descent with genetic variation.

Now, why would Moreland et al. reject this evolutionary creation perspective or any other view that posits a creation provided by God with a gapless

economy — a view, as we have noted, with deep roots in historic Christian theology? Moreland's answer is given in a passing reference to what he perceives to be a biblical requirement: "[M]any Christian intellectuals, including Old Testament scholars, do not believe that Genesis is consistent with theistic evolution as it is usually presented. Instead they opt for some form of special creationism. We side with these scholars ..."(14). Curiously, no particular biblical scholars are cited here by Moreland.

Moreland's rejection of evolutionary continuity and his adoption of the special creationist picture is in tension, however, with his stated attitude toward big bang cosmological theorizing. "Now, while it may be true that a full-blown acceptance of every detail of the theory may not harmonize with certain respectable ways [again, no references cited] of understanding Genesis 1, one thing seems clear: in spite of certain scientific problems with the big bang theory, it is currently the most reasonable and widely respected view, and it does confirm the fact that the space-time physical universe had a beginning"(20). It seems that, although the presumption of a gapless developmental economy is considered unacceptable in biological theorizing, no objection is raised here concerning its employment in cosmological theorizing. After all, the big bang concept does support the idea of a beginning.

This ambivalence toward continuous development is amplified by many favorable references to the concept of "fine-tuning" in the values of several cosmic constants and to the "delicately balanced set of preconditions" for the "emergence of any life, including human life" in the universe(30). However, once one adopts a special creationist stance, as Moreland does, the need for fine-tuning and for many of these preconditions disappears. In fact, the presence of both would appear entirely surprising, thereby weakening the case for special creationism. More on this later.

Design argument or *design perspective*?

The term *"design argument"* arises from the apologetic employment of "design" in *arguments* to prove the existence of God. *"The design argument's* most fundamental point can be put in this way," says Moreland. "Science cannot explain away all examples of order ... as being the result of merely natural processes, because scientific explanations presuppose and must start with ordered entities and laws"(23). Therefore, if "natural processes," *as presently understood*, are deemed insufficient to accomplish the kinds of ordering we see, then it seems most reasonable to Moreland et al. to account for this ordering by appeal to the action of a Designer. "There is no good reason to leave these examples of order as brute, unexplained realities, and there is good precedent to explain them as the result of a mind; the design argument capitalizes on this insight"(24).

What I prefer to call the "design perspective" would do the same, but it would not burden the argument with the additional presumption that, *if designed* (intended) by a mind, *then accomplished* by means of coercion — manipulating matter and material systems into assuming structures and forms they were not equipped to actualize by the exercise of their God-given capacities. A "design perspective" would focus on perceiving the whole universe, wondrously rich in its capacities and potentialities, as an astounding manifestation of thoughtful divine intentionality. It would not focus (as the design argument does) on finding specific instances in which it is possible to argue that something must have occurred because of the divine manipulation of some creaturely entity.

"We claim," says Moreland, "that when one actually examines the scientific evidence for the real design in the world, it becomes much less plausible to believe that the design in this world is the result of chance or some other factor apart from God"(28). I agree, of course, provided that the primary inference of being *designed* is "being the actualized product of thoughtful intention," not "being the contrived product of coercive action." I heartily support a *design perspective*, but find no warrant at all for the presumption that the intentions of design must be accomplished by means of *special creation*.

Addressing the objection that the concept of macroevolution makes the design argument implausible, Moreland outlines two possible strategies for response: (1) to focus on nonbiological examples of design, including the preconditions for life; (2) to grant, at least for the sake of argument, the possibility that the macroevolutionary picture may be correct, and proceed to "build a design argument based on broader features of order and purpose, even on the existence of the mechanisms of evolution"(31). While this second approach is the one that I would advocate, not merely for the sake of argument but because I believe it to be the best way to account for the way things are, Moreland rejects it. Why? Because, he says, "it is hard to square with the early chapters of Genesis and with the empirical facts of science itself"(31).

The book goes on to build the authors' case regarding their interpretation of some empirical results, but nowhere does it deal substantively with questions of biblical interpretation. There is not even a listing of those biblical scholars whose interpretation the authors favor. Given my conviction that particular beliefs regarding the requirements of biblical interpretation lie at the root of nearly all Christian anti-evolution attitudes, I find this to be a telling omission. If theological propositions are to be an essential part of "theistic science," then why is there no discussion of the warrant for special creationism, which is the very proposition that makes this "research program" unique?

Nonetheless, without any elaboration of the presumed biblical basis for special creationism, Moreland says that the strategy of this book's authors will be "to criticize evolutionary theory and present a creationist alternative to it"(31). In his foreword, Phillip Johnson, a vocal critic of evolutionary biology, says that "A creationist is simply a person who believes that God creates ...." But that initial appearance of congenial openness to a full spectrum of differing concepts of divine creative activity is quite misleading. Throughout this volume, when the terms "creationist" or "creation" are used, they presume a specifically *special* creationist picture of God's creative activity being manifested as a series of "direct, discontinuous, miraculous actions" in time. But if *special* creationist is meant, why not say it? Why, for instance, is the book's title not *The* Special *Creation Hypothesis*?

In a similar manner, the vast majority of references in this book to "design" and to the "design hypothesis" or "design argument" or "intelligent designer" presume, without explicit argumentation, that if the universe shows evidence for design, then it must have gotten that way because of special creation. Once again, if "special creation" is meant, why not say it? Why dress special creationism in "designer" clothing?

Down with *methodological naturalism*!

Philosopher J. P. Moreland follows his extensive introduction to the book with a chapter in which he presents his "critique of methodological naturalism and a limited defense of theistic science"(41). Recall that, as it is defined and employed in this book, "theistic science" is a research program committed to the expectation that some of God's creative action would have been manifested as episodes of divine miraculous intervention in time. Therefore, "[G]aps in the fossil record are not problems in need of solution for creationists ... [T]hese phenomena are basic for creationists ... [I]t is enough for creationists to use theological notions to guide them in the quest for scientific tests to establish the phenomena predicted by their theological constructs"(64).

But *which* theological constructs does one choose to employ? Most noteworthy here is the disparity between the special creationist "construct" promoted in this work — that God has "directly intervened" in the formative history, including prehistory, of the world — and the position held by Augustine, with whose foundational advice Moreland opened the introduction to this book. Augustine, in his extensive commentary on Genesis 1-3, *De Genesi ad litteram*, or *The Literal Meaning of Genesis*, explicitly rejects the special creationist construct and adopts the position that the functional and developmental economies of the created world were gapless from the very beginning.[2]

Moreland contrasts the "theistic science" research program, committed to *special creationism*, with one committed to *methodological naturalism*. He defines methodological naturalism as a scientific research program committed to considering only those theories that are consistent with "a naturalist standpoint in explaining things in science"(33). Here the term "naturalist" is given its meaning from philosophical naturalism. In contrast to Christian theism, "Naturalism may be defined as the view that reality is exhausted by the spatiotemporal world of physical entities embraced by our scientific theories"(21). Therefore, *methodological naturalism* is presented by Moreland (see also Stephen Meyer's chapter) as a scientific strategy that begins with *philosophical naturalism*, then strips away all explicit reference to the offensive atheistic metaphysics, leaving only the *methodological* rules that proscribe any consideration of divine action. So defined, *methodological naturalism*, sometimes dubbed with the even more pejorative label, *provisional atheism*, should find no welcome within the Christian community.

How utterly frustrating, then, for me to see Howard J. Van Till identified by Moreland as one of those misguided Christians who, as discerned from "a straightforward reading of their writings," would affirm: (1) that "natural science, by its very nature, presupposes and is constituted by *methodological naturalism*," and probably also (2) that "the very nature of natural science entails the impropriety of theistic science"(42). I do not wish here to belabor the matter of defining "natural science" or of specifying its rules of methodology, since that can soon degenerate into a trivial semantic exercise. The term

natural science can be defined in any way that one chooses. Some definitions characterize science well; others do not. Some definitions characterize science as experienced by those who do it; other definitions characterize science as perceived by those who talk about it. But it should be clear to anyone that one's chosen definition for *natural science* has no bearing at all on the propriety or impropriety of a different research program that its proponents choose to call "theistic science."

Do I think that "theistic science" is the best choice for the name of that enterprise? No, but its proponents are free to call it whatever they wish. My chief objection is that calling this broad enterprise — an enterprise broad enough, apparently, to reach apologetically significant conclusions regarding the reality of divine intervention — a form of *science* might suggest to some persons that the anti-theistic propaganda often presented in the name of *science* also has a chance of being apologetically substantive. Perhaps the research program proposed in this book would be more aptly called *theistic natural philosophy*, a name that would better indicate that its scope is greater than what is ordinarily called *natural science* and a name that would also reflect the fact that its principal proposers (Plantinga, Moreland, Meyer) are philosophers, not scientists.

On the matter of *methodological naturalism* my concerns must be stated far more crisply. To the best of my recollection, I have never approvingly employed the term *methodological naturalism* in my writing.[3] Why not? Because I have long had a profound distaste for that label, though it may be possible to define and employ it so Christians and other theists would have little objection to it. But in most presentations claiming to offer a distinctively theistic perspective regarding the evaluation of contemporary natural science in general, or of the concept of biological evolution in particular, the term *methodological naturalism* is frequently placed in such close association with the terms *philosophical naturalism*, *metaphysical naturalism*, and *provisional atheism* that some malodorous transfer is unavoidable. It is the familiar rhetorical strategy of "stench by proximity," in which the noun, *naturalism*, is perceived to have an odor so foul as to overpower the perfume of the qualifying adjective, *methodological*.

Consequently, instead of trying to deodorize and employ so problematic a term as *methodological naturalism*, I have chosen to focus on the concept of creation's *functional integrity* (or, if you prefer, the idea that the functional and developmental economies of the creation are gapless). I have drawn, not from the fouled wells of metaphysical or philosophical naturalism, but from early Christian theological sources, primarily from biblical commentaries on Genesis written by Basil and Augustine. Given *that* vision of what God has brought into being, I fully expect that our systematic, empirical investigation of the created world will provide us with an ever-growing knowledge of the awesome capacities with which this world has been gifted.

In this expectation, then, when I am faced with a gap in our understanding of some element in that economy (even a stubbornly persisting gap), I am not at all inclined to postulate that this gap in human understanding should be taken as compelling evidence for the existence of a gap in creation's economy that could be bridged only by a "special" act of God. Rather, I take this gap as an attractive invitation to continue research in that area because something remarkably interesting may be lurking behind the veil of our present ignorance. Furthermore, I take this position thoughtfully, not because of being asleep at the wheel of Christian scholarship and veering off into the quagmire of philosophical naturalism or into the swamp named "Do Whatever the Secular World Wills."

Part of the difficulty in these matters is generated by the ambiguity that follows from the failure, very common in anti-evolution literature, to distinguish two very different meanings for the word *naturalistic*.[4] One meaning, I shall call it *naturalistic (narrow)*, is very limited in scope and simply refers to the idea that the physical behavior of some particular material system can be described in terms of the "natural" capacities of its interacting components and the interaction of the system with its physical environment. Therefore there is a *naturalistic (narrow)* theory of planetary motion, or of star formation, or of earthquakes, or of cell behavior, or of photosynthesis, or of the development of a zygote into a mature organism.

So understood, *naturalistic (narrow)* speaks only to the idea of the functional integrity of a material system as it acts and interacts in time. No stance regarding the ontological origin of its existence is either specified or implied. Nor is the ultimate source of its capacities for behaving as it does, or its purpose in the larger context of all reality, or its relation to divine action or intention. Defined in this way, *naturalistic (narrow)* has no elements or connotations that would be in any way objectionable in principle to Christian belief.

The other definition, which I shall call *Naturalistic (broad)*, is far more expansive in scope. It not only includes all of the elements of *naturalistic (narrow)*,

but it also superimposes the strong metaphysical stipulations that neither the existence nor the behavioral capacities of material systems derive from any divine source (thereby making a Creator unnecessary) and that the behavior of material systems can in no way serve in the attainment of any divine purpose or intention. So defined, *Naturalistic (broad)* is essentially identical to *materialistic* and is, therefore, absolutely irreconcilable with Christian theism. Any critique of *methodological naturalism* that fails to honor the distinction between the broad and the narrow meanings of *naturalistic* is, I believe, sure to generate more heat than light, more hostility than learning.

Only two options?

The primary goal of Stephen C. Meyer's lengthy chapter, "The Methodological Equivalence of Design and Descent," is to debunk the use of demarcation arguments for discrediting the concept of "design" in the historical sciences. For Meyer, "design" entails a reference to "the past action of an intelligent agent" to cause some specific outcome (like the "origin" of life, of human consciousness, of the universe itself) deemed beyond the capacities of physical or biological systems. In his words, "Whatever the evidential merits or liabilities of design theories, such theories undoubtedly represent attempts to answer questions about what caused certain features in the natural world to come into existence"(93). "[T]heories of design involving the special creative act of an agent conceptualize that act as a causal event"(94). Stated more directly, *designed* means *not only thoughtfully intended, but also actualized by means of special creation.*

Meyer places the concept of "intelligent design" over against the concept of "naturalistic descent." Theories of "intelligent design" are "those that invoke the causal action of an *intelligent* agent ... as part of the explanation for the origin of biological form or complexity." Theories of "naturalistic descent," on the other hand, are "those (such as Darwin's 'descent with modification') that rely solely on *naturalistic* processes to explain the origin of form or complexity"(71). At this point the obvious question is, Does Meyer here mean *naturalistic (narrow)* or *Naturalistic (broad)*? If he means *Naturalistic (broad)*, then all Christians must categorically reject such theories, leaving only *intelligent design* (actualized in miraculous acts of special creation) as an acceptable option. If, however, he means *naturalistic (narrow)*, then the question of how intelligent design (as thoughtful intention) might have become actualized in time remains unanswered.

Perhaps Meyer did not intend to imply that *design* and *descent*, as he defines these two terms, are the only two options. I would have welcomed a third—not the stark choice of **either** (1) intelligent design (actualized in acts of special creation) **or** (2) Naturalistic (broad) descent, but (3) **both** intelligent design (that is, thoughtfully intended by a transcendent Creator) **and** naturalistic (narrow) descent (as the exercise of the remarkable capacities generously given by the Creator to biological systems). I take Meyer's omission of that third option to mean that he does not consider it a viable one.

This conclusion is affirmed, I believe, when Meyer notes that "where origins are concerned only a limited number of basic research programs are logically possible. (Either brute matter can arrange itself into higher levels of complexity or it does not. If it does not, then either some external agency has assisted the arrangement of matter or matter has always possessed its present arrangement.)"(102). What Meyer (consistent with most contributors to this book) does not consider seriously is the possibility, held by many Christians, that matter does, by God's generous provision, have this astounding capability.

Even setting aside the particular capacities contested in this book, I would argue that we need to be far more astounded at what physical and biological systems can do. Pick whatever example you like; then ask, How is this possible? From what source do such wonders proceed? Is this nothing more than sheer accident? A self-created fortuity? An unthought happenstance? A self-explanatory, but purposeless fluke? Try any answer that philosophical naturalism could possibly offer. The result: it has no satisfactory answer to offer! And adding more capacities to the list does not make it *easier* for materialism, it makes it even more *difficult*!

So why all the effort to find gaps in the developmental economy of the creation? Is not a gapless economy far more awesome and far more demanding of divine creativity? Does our apologetic engagement with naturalism really need to be shored up with "special effects?" Are not the things that take place as part of our daily experience more than enough to affirm the truth of Romans 1:20, even without the insights of modern natural science? How could this world be anything but the manifestation of thoughtful and purposeful intention? As I see it, a profound *design perspective* is in no way dependent on, or strengthened by, finding gaps in the developmental economy of the creation.

Is the supernatural empirically detectable?

Bill Dembski's contribution to this book focuses on the question, "Is there anything that has, could or might happen in the world from which it would be reasonable to conclude that a supernatural Designer had acted"(118). Among the listed attributes of a "supernatural Designer" is "intelligence," defined by Dembski to be the capability "of performing actions that cannot adequately be explained by appealing to chance"(116). By an argument based on the concept of a hypothetical oracle called "the incredible talking pulsar," Dembski arrives at the conclusion (not at all surprising in this context) that "Design is therefore knowable on rational and empirical grounds"(129).

Where, specifically, can empirical evidence for specific past action of a supernatural Designer be found? Dembski evidently already knows. "[W]hen it comes to the origin of life there is a compelling argument to be made for design"(122). The substantiation for this claim is promised to appear in a forthcoming book (with S. Meyer and P. Nelson) in which the design argument is to be revitalized. "Such a revived design argument begins with living systems, looks to results from probability and information theory, cybernetics, computational complexity theory, molecular biology, and chemistry, and concludes that any naturalistic [broad? narrow?] alternative to design fails"(133). I presume this to mean that all possible alternatives have already been exhaustively examined by the authors and found inadequate — a remarkably bold claim indeed!

Design as purposeful intention

Hugh Ross, trained as an astronomer, presents a concept of *design* and its inferences that is quite different from the concept employed by the other contributors to this book. When Ross speaks here of *design*, his focus is on the issue of *purposeful intentionality*. A remarkably diverse array of correct numerical values for physical parameters and of fruitful form-producing capacities for the behavior of matter and material systems are provided. When he offers examples of what he considers to be clear empirical evidence for *design*, the vast majority of these examples have significance only against the background of the assumption that the functional and developmental economies of the universe are gapless — not marked by gaps or deficiencies to be bridged by compensatory or corrective interventions.

One sentence, however, stands out as an exception to this emphasis. Toward the end of the chapter, after calling attention to all of the numerical and behavioral parameters that must fall within narrow limits in order for the universe to have experienced the continuous and constructive formative history envisioned by contemporary scientific cosmology, Ross inserts his judgment that, "Evidently personal intervention on the part of the Creator has occurred not just at the origin of the universe but also at much more recent times"(170). Nowhere else in this chapter is there any suggestion that design must be effected by means of irruptive divine intervention in time, only that there is abundant evidence for thoughtful foresight and provision. One could well ask, If God were planning to employ a series of "special effects" in time anyway, why go through the trouble of setting up that remarkable system of fine-tuning in the first place? (Correspondence with the author revealed that his preference for the special creationist scenario, although not defended in this essay, is explained in other writings.)

Concerning all of the cosmic parameters and all of the historical processes and events that had to coordinate in just the right manner so that our arrival on the scene could take place, Ross says: "Astronomers have discovered that the characteristics of the universe, of our galaxy and of our solar system are so finely tuned to support life that the only reasonable explanation for this is the forethought of a personal, intelligent Creator whose involvement explains the degree of fine-tunedness"(160). Therefore, "the rational conclusion to draw from the incredible fine-tunedness of the universe and the solar system is that someone purposed that we should live"(171).

I concur with Ross on this matter and on his employment of the term *design* to show the evidential and experiential basis for our perceiving the whole universe around us — not only its present state but its entire formative history — as the manifestation of God's thoughtful, purposive, and effective intentions. I could be equally comfortable with many other statements in this book regarding *design* if it were not for the fact that this term is most often taken to entail its realization by means of special creation (miraculous intervention). For that additional stipulation I find no warrant — certainly not in this book.

How *did* life first become actualized?

How did the first form of life become actualized? By *naturalistic (broad)* means? By *naturalistic (narrow)* means? By means of *intelligent* design? By means of *special* creation? In their reflection on choices of

this sort, Walter Bradley and Charles Thaxton, in their chapter on "Information and the Origin of Life," make a very important distinction, one rarely found elsewhere in this volume: "It is worth noting here that affirming natural causes as the probable source for the origin of life, as most origin-of-life scientists do, does not necessarily mean naturalism ... This means we may not infer from experience the metaphysical conclusion of naturalism"(176, 177). Using the terminology that I introduced earlier, I take Bradley and Thaxton to be affirming that *naturalistic (narrow)* does not at all imply *Naturalistic (broad).*

They go on to say, "Likewise, when one infers by experience an intelligent cause to account for the structure of life, it does not carry the necessary conclusion of supernaturalism"(177). Does this mean, then, that when Bradley and Thaxton argue in favor of *intelligent design* as the ultimate source of biological information they would prefer not to impose the additional requirement that it be realized by means of *special creation* only? Would they prefer instead to remain open to the possibility of its natural realization (that is, the *narrow* meaning of *naturalistic*) within a creation gifted with a gapless economy? If their references to *intelligent design* are intended to include that possibility, then I take no issue with the conclusions reached by Bradley and Thaxton. But it is not clear that this is their intention. In fact, it would appear that it is not.

The heart of this very difficult "origin-of-life" problem seems to be the question of how to account for the formation of material systems having the requisite *specified complexity* or *biological information.* To Bradley and Thaxton "It is clear that the information/complexity problems associated with the origin of life present challenging, maybe even intractable, problems"(191). In agreement with Robert Shapiro, these authors would say that "all current theories are bankrupt and that we need to find a new and more fruitful paradigm to guide our search for a naturalistic explanation for the origin of life"(196). But Bradley and Thaxton go beyond Shapiro to say, "However, we believe that the problem is unnecessarily exacerbated by the conventional wisdom that would restrict our considerations to natural causes, explanations based on chemistry and physics alone"(196).

Thus it appears that a *naturalistic (narrow)* account, one committed "to the search for natural processes irrespective of metaphysical commitment" is judged by Bradley and Thaxton to be inadequate. They consider this approach to be "in error and that those who promote it place an unnecessary demand on both nature and scientific methodology"(197). Consistent with this judgment, they proceed to argue that *specified complexity,* the kind of order found in DNA, cannot be accounted for in terms of natural causes and therefore provides direct evidence for the action of some *intelligent cause* (agent). By analogy with written messages, they conclude "that the remarkable information sequences in DNA also had an intelligent source." Furthermore, "Since DNA is an essential molecular component of every form of life we know, we likewise conclude that life on earth had an intelligent cause"(206).

Arguing by appeal to empirical science, they state their judgment that "there is no convincing experimental evidence that order with high information content (... specified complexity) can arise by natural processes"(208). Therefore, "given the information in a DNA molecule, it is certainly reasonable to posit that an intelligent agent made it. ... scientific investigations of the origin of life have clearly led us to conclude that an intelligent cause may, in the final analysis, be the only rational possibility to explain the enigma of the origin of life: *information*"(209).

In his earlier chapter on "design versus descent," Meyer asserted that Bradley and Thaxton "postulate intelligent activity not because of what we do not know, but because of what we *do* know about what is and what is not capable of producing coded information"(97). It must, however, be noted that their appeal (or anyone's appeal) to "no convincing experimental evidence" must necessarily be accompanied by a candid recognition of the fact that *known* evidence is minuscule and imperfectly understood compared with *potential* evidence not yet known or fully comprehended. The contributors to this book are relying on the expectation that certain kinds of evidence will never appear; most scientists are proceeding on the expectation that it will. Time will, of course, tell.

Furthermore, what does it mean to say of the information content in DNA that "an intelligent agent made it?" Does this necessarily mean *special creation*? In other words, is this a reference to some sort of *theokinetic* event in which God appears momentarily as a physical agent to move atoms and molecules into configurations that they were ill-equipped to achieve by the exercise of the capacities originally given to them by God? Or, on the other hand, could "an intelligent agent made it" mean "achieved by matter's exercise of those capacities graciously provided by the Creator to make such remarkable structures realizable?"

If I understand Bradley and Thaxton correctly, they strongly prefer the *special creation* picture over

anything closely resembling my *evolutionary creation* perspective. If that is so, and if, as I believe they would say, special creation is the sort of concept that must be warranted by extrascientific means, where in this volume is the development of the extrascientific warrant for that concept? The contributors to this work have every right to defend the special creationist perspective as the foundation for "theistic science" (or "theistic natural philosophy"). However, to be consistent with Bradley's and Thaxton's admonitions regarding the limits of what can be derived from empirical considerations alone, the warrant for that perspective must then be developed from extrascientific considerations.

Inferences from Scripture

Paleontologist (and advocate of young-earth "creation-science") Kurt Wise, in his chapter on "The Origin of Life's Major Groups," concedes that "Macroevolution is a powerful theory of explanation for a wide variety of physical data." Nonetheless, it is his considered judgment that "the claims of Scripture provide us with a model that can give a better explanation of far more of the major features of life than evolution." For example, after a general reference to the biblical teaching that God created all things in a way that reflects his own nature, Wise says that "We infer from the nature of other things he created that he fashioned all things in a mature form and in a hierarchical pattern. In the case of life, we are told that he created a number of distinct kinds of organisms"(232). In addition to this appeal to special creationism, Wise cites flood geology as having great explanatory value. "A global deluge that gradually buried organisms already filling a well-integrated biosphere explains the *general water-to-land fossil order* as well as *stratigraphic intermediates* among the plants and vertebrates, often used as evidence for evolution"(233).

In some cautionary comments against making "foolish assertions without experiential basis," especially regarding the identity of causes, Bradley and Thaxton remarked: "A curious propensity afflicting many people ... is to go ahead and name a cause even when they cannot be certain. The 'cause' is almost always generated by their philosophy or religion"(198). Well said. I think most of us are culpable on that point, including the contributors to *The Creation Hypothesis*.

Beginning on a sour note

Finally, let me comment about the book's beginning. In his brief foreword, law professor Phillip Johnson, moving quickly and with long strides along a stepping-stone path of vaulting inferences, tells us that "[M]odern culture is ruled by a philosophy called *scientific naturalism*, which insists that the entire history of the cosmos belongs to the subject matter of science. Science, by the same philosophy, is inherently committed to *naturalism*. Naturalism is the doctrine that the cosmos has always been a closed system of material causes and effects that can never be influenced by anything from 'outside' — like God."

Johnson continues, "Naturalism rules the secular academic world absolutely, which is bad enough. What is far worse is that it rules much of the Christian world as well ...[I]t is common for philosophers even at conservative Christian institutions to accept the rules of scientific naturalism, and to accept them for no better reason than that the secular world wills it to be so. It is no wonder that the best students from these institutions so often emerge with a naturalistic outlook; that is how they have been taught to think"(7).

Notice how easy it is to exploit the ambiguity that follows when one chooses not to differentiate the narrow and broad meanings of *naturalistic*. Notice also what is here being said about the many members of the ASA who are on the faculties of Christian educational institutions. Given the irenic tone maintained by most of the contributors to this volume, I am disappointed that the editor chose to include so denunciatory a foreword as this. ✪

NOTES

[1]For an overview of the approach to Genesis taken by Basil and Augustine see my essay, "Is Special Creationism a Heresy?" in *Christian Scholar's Review*, XXII:4, pp. 380-395, June, 1993; also published as a chapter, "When Faith and Reason Meet," in the book, *Man and Creation*, Michael Bauman ed. (Hillsdale, MI: Hillsdale College Press, 1993), pp. 141-164.

[2]Augustine, *The Literal Meaning of Genesis*, trans. John Hammond Taylor, vol. 41 and 42 in the series, Ancient Christian Writers (New York: Newman Press, 1982).

[3]For a sample of my explicit rejection of this term see my essay, "When Faith and Reason Cooperate" in *Christian Scholar's Review*, XXI:1, pp. 33-45, Sept., 1991.

[4]See my contribution to "God and Evolution: An Exchange" (with Phillip E. Johnson) in *First Things*, No. 34, pp. 32-38, June/July. 1993; also reprinted in the book, *Man and Creation*, Michael Bauman ed. (Hillsdale, MI: Hillsdale College Press, 1993), pp. 269-286.

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James Peck
Alan Pense
Lyle Peter
James Petersen
Arthur Peterson
James Peterson
Walter Pfleger
C. Anthony Phillips
Perry Phillips
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Larry Postma
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J. David Price
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Pattle Pun
Johan Ramon
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Julie Robinett
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C. Bruce Wenger
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Philippa Westerman
Melvin Westwood
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William Wharton
Elden Whipple
Reuben Widmer
Georgia Wiester
John Wiester
David Wilcox
Robert Wilhelmson
Leland Williams
David Willis
Charles Willits
Steven Wilson
William Witherspoon
Enno Wolthius
John Woodburn
John Woods
Kevin Woods
Dorothy Woodside
David Yee
L. William Yoder
Fred Zeisler
Congcong Zhang
Robert Ziegler
Elizabeth Zigf

Book Reviews

THE CREATOR AND THE COSMOS: How the Greatest Scientific Discoveries of the Century Reveal God by Hugh Ross. Colorado Springs, Colorado: NavPress, 1993. 155 pages, notes, indices. Paperback.

Hugh Ross received his Ph.D. in astronomy, carried out research on quasars and galaxies as a post-doctoral fellow, served as church minister of evangelism, and currently directs *Reasons To Believe* providing "research and teaching on the harmony of God's revelation in the words of the Bible and in the facts of nature."

Every committed Christian must rejoice at an attempt to shatter the common modern myth that science has made Christian faith meaningless, and that, to the contrary, the description of the universe developed by modern scientists provides consistent evidence for a faith in the God of the Bible and his activity in the universe. Much of the material presented in this book is excellent and makes a good source for sharing, teaching, and encouraging understanding of modern scientific descriptions. It can be profitably used (carefully) in evangelical apologetics.

Unfortunately, however, the author often follows a somewhat questionable approach in his eagerness to be convincing. Central to these problems is the general failure to recognize that the position that God is not properly taken to be a mechanism in scientific descriptions in no way contradicts the position that scientific descriptions are our ways of picturing God's activity. This misunderstanding characterizes a large portion of the evangelical critique today. The author repeatedly insists that we must choose between "strictly" natural processes, and the direct non-scientifically describable acts of God (pp. 102-103); he apparently has little place for the category of scientifically-describable processes as our description of God's activity. He accentuates the dilemma by drawing a false distinction specifically, "A second response is that to believe in creation by God is not to claim that all the development in organisms is strictly divine. In addition to divine intervention, natural processes are obviously at work to change, at least to some degree, the form and function of organisms" (p. 104). Does he really wish us to believe that those things occurring by "natural processes" are happening without God?

"If the universe arose out of a big bang, it must have had a beginning. If it had a beginning, it must have a Beginner" (p. 14). This historic argument is consistent with a faith in God, but it is not itself logically demanding without a faith in God. Or again, "... the six discoveries provide overwhelming evidence that astronomers and astrophysicists are on the light track in determining that a hot big bang model best describes how the universe came to be — and in concluding that God is the power and intelligence behind it all" (p. 33).

Commenting on Genesis 1, he writes, "Here was a journal-like record of the earth's initial conditions — correctly described from the standpoint of astrophysics and geophysics followed by a summary of the sequence of changes through which Earth came to be inhabited by living things and ultimately by humans. The account was simple, elegant, and scientifically accurate" (p. 15). The insistence that the Bible gives us accurate scientific knowledge, in spite of the fact that this was not the purpose of its writing, leads to a whole host of well-known problems. In another place he writes, "The space-time theorem of general relativity leads not just to a theistic conclusion but specifically to the God of the Bible" (p. 71). Or again, "General relativity and the big bang lead to only one possible conclusion: a Creator matching the description of Jesus Christ" (p. 74).

The author has a fascination with large powers of ten and quasi-probabilities. Very early in the book, he tells how he mathematically determined that the Bible was more reliable than the laws of physics, by showing that the Second Law of Thermodynamics had one chance in 10^{80} of being wrong whereas the probability of a chance fulfillment of thirteen Biblical prophecies was only one in 10^{138}, thus showing that the Bible was 10^{58} times more reliable than thermodynamics. Again he tells us that, "If one were to take the simplest living cell and break every chemical bond within it, the odds that the cell would reassemble under ideal natural conditions (the best possible chemical environment) would be one chance in $10^{100,000,000,000}$. It is well known that there are at least two major problems with this kind of reasoning at its best: (1) calculations based on uninformed chance alone easily overlook many factors that greatly increase the probability of "improbable" events, and (2) calculations based on uninformed chance can be used to show that the occuance of any particular event to any particular person in any particular place at any particular time is ridiculously improbable — even though it happens all the time.

The terms "evidence" and "proof" are carelessly interchanged, claims are made that exceed the evidence, and poetry replaces factual description. "By 1986, several breakthrough discoveries uncovered proofs for the God of the Bible.... Secular scientists have reported to the media that these new findings reveal the face of God more clearly than ever" (p. 17). "No society has seen as much proof for God as ours" (p. 87).

The author repeatedly speaks of the concept of "physical law" as something that causes things to happen, rather than recognizing that a "physical law" is a human description of what is observed; e.g., "the laws of thermodynamics compel the maximum diameter of the universe to increase from cycle to cycle" (p. 59). For the Christian, natural law is a human description of God's activity in

the universe. Or again, "Nothing in the physical world can be trusted to exist if we reject the physical laws" (p. 66); and, "Lerner notes that the laws of nature cannot explain the amazing advance in complexity of living organisms that has taken place on Earth over the past four billion years. He acknowledges that this advance stands in violation of the second law of thermodynamics" (p. 65). This issue has been debated and settled many times before by recognizing that if the second law of thermodynamics is an accurate description of everything in our universe, it applies specifically only to a closed system—which the developing earth, with input of energy from the sun, was not.

It is truly unfortunate that so many misunderstandings should obscure what is in itself the totally desirable task of indicating the evidences provided by science that are consistent with the revelation of God of Himself in the Bible. The dangers implicit in this kind of approach, that so closely identifies the most current scientific models with the truth of God's universe and revelation, is that it leaves the most basic issues at the mercy of unknown changes in our scientific descriptions in the future. Today it may look as if certain current scientific descriptions are totally consistent with a particular Biblical view; what happens tomorrow if those scientific descriptions change?

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THROUGH A UNIVERSE DARKLY by Marcia Bartusiak. New York, NY: HarperCollins, 1993. 383 + xvi pages, bibliography, index. $27.50.

A major puzzle of astrophysics concerns a great deal of matter in the universe which we can observe only indirectly, through the gravitational effects it exerts. This "dark matter," which may make up more than ninety per cent of the content of the universe, would have a profound effect on cosmic evolution. Marcia Bartusiak, the author of *Thursday's Universe* and a number of popular articles on the dark matter problem in *Discover*, does not simply drop her reader into the middle of current discussions. She presents the problem as part of the whole history of scientific attempts to discern the composition of the universe. The book's subtitle captures the sweep of this story: "A cosmic tale of ancient ethers, dark matter, and the fate of the universe."

From its beginning in speculation about the composition of the universe among Ionian philosophers, two threads intertwine in this account: what is matter made of at its most basic level, and how is the matter of the universe arranged on the largest scale? Those two questions gave rise eventually to today's particle physics and cosmology. The realization that those branches of physics are closely connected, that particle theory and the big bang model can inform one another, is a major part of Bartusiak's account. The early history, to 1800, is told quickly. From that point the story takes a more leisurely pace, with insights into the personalities involved in scientific developments.

Several scientists in the history of this search are women: astronomy was open to their participation before other sciences, though even here they were hindered by prejudice. Cecelia Payne (later Payne-Gaposchkin), whose work showed that hydrogen was the predominant element in stars, and Vera Rubin, whose studies of the rotation of galaxies revealed that they contain a considerable amount of non-luminous matter, are only two of the women in the story. But the young Payne, coming up against the ideas of giants like Shapley, Eddington, and Russell, was not the first scientist to back away from a discovery because it went against then-current wisdom.

Detection of interstellar molecules, studies of elusive neutrinos, excursions into the possible inflationary phase of the first fraction of a second of cosmic history, and demonstration of the "foamy" distribution of galaxies throughout the universe, are a few topics which Bartusiak explores. A search for enough matter to make the dynamics of galaxies or clusters work properly might be only of academic interest, but that matter would also make a crucial difference for the dynamics of the entire universe, determining whether the present cosmic expansion will continue forever or eventually be reversed. At least as far as science is concerned, "the fate of the universe" really is in the balance.

The book is written well enough that lay readers will be disappointed, but still feel that their journey has been worthwhile, on finding at the end that the question of dark matter has not yet been resolved. It may be brown dwarfs, massive neutrinos, as-yet purely theoretical particles such as axions, or some combination thereof. The author has simply brought the reader to the current state of uncertainty in scientific cosmology.

The presentation is not perfect. Copernicus did not eliminate all epicycles (p. 346), and Milgrom's theory (pp. 213-214) involves modification of Newton's second law of motion, not his law of gravitation. But given the scope of the subject, there are relatively few such inaccuracies.

Readers of this journal will be interested in the implications which the dark matter quest might have for science-theology dialogue. In one way it is to the author's credit that she does not deal with such questions. Too many writers of popular works on scientific cosmology have felt automatically entitled to pronounce on religion. Those who are interested in theological matters will find some stimulus here: How thoroughly do we really know the universe, how much confidence can we have in our present cosmological theories, and what will be the final state of the physical universe? *Through a Universe Darkly* does a good job of providing the scientific background for such questions.

Reviewed by George L. Murphy, Pastor, St. Mark Lutheran Church, Tallmadge OH 44278.

THE LEFT HAND OF CREATION: The Origin and Evolution of The Expanding Universe by John D. Barrow and Joseph Silk. New York, NY: Oxford University Press, 1993 (revised). 262 pages, glossary, index. Paperback; $10.95.

In light of recent developments in cosmology, two well-known astronomy professors have updated their ten-year-old book, *The Left Hand of Creation* — Oxford's John Barrow, author of *World Within a World* and co-author of *The Anthropic Cosmological Principle*, and Berkeley's Joseph Silk, author of *The Big Bang: The Creation and Evolution of the Universe*. The book is a fine introduction to cosmology for the serious-minded nonspecialist, including helpful charts, illustrations, glossary, and (a sometimes inaccurate) index. It is an improvement on Hawking's *A Brief History of Time* in scope but not simplicity. It lucidly explores quantum theory, vacuum fluctuations, black holes, and much more — at an almost-dizzying pace.

What is the "left hand of creation?" It refers to the "tiny, fortuitous breaches of complete symmetry" in the universe (229); these breaches are "the cogs of a glittering mechanism at the center of things, and one of the reasons our very existence is possible" (xxiv). As one reads the book, one is struck by the perpetual reminders of the delicately-balanced nature of the cosmos: "In many respects the universe is tailor-made for life" (227); "the universe is a surprisingly complex place" (26). Despite the non-theistic outlook of the authors, they inadvertently demonstrate the high plausibility of the Design hypothesis. At one point they admit, "Our new picture [of the universe] is more akin to the traditional metaphysical picture of creation out of nothing" (38).

The book is broken down into six chapters. Chapter one, "Cosmos," establishes a case for the universe's antiquity (about 15 billion years) and the Big Bang's validity. The second chapter, "Origins," attempts to get as close as possible to the nature of the elusive initial singularity of "infinite density"—whatever that means—although present theories break down before the Planck moment. Chapter three, "Creation," sets out the basic nature of particle physics as it relates to the universe's origin and evolution as well as that of the four forces—weak, strong, electromagnetic, and gravitational—and their interrelationship (or lack thereof) as the hot universe began to cool. Given the higher temperature of the universe's early moments, matter behaved differently than it does presently. The fourth chapter, "Evolution," analyzes the origin and structure of galaxies. Chapter five, "Chaos and Cosmos," discusses issues surrounding the isotropic expansion of the universe, time, the universe's horizon, and the Anthropic principle.

My primary concern is to address the metaphysical issues the book raises — especially in the sixth chapter, "Conclusions and Conundrums." What becomes clear through one's reading is the very uncomfortable position in which the secular astrophysicist finds himself in light of the universe's emergence out of nothing and its astonishing life-permitting conditions. Fortunately, this book makes fewer metaphysical extrapolations than in, say, Tipler's earlier *World Within a World* or *The Anthropic Cosmological Principle*, given the previous lack of philosophical rigor in argumentation (such as the arbitrary rejection of the teleological argument or the notion that the universe itself could be the uncaused cause).

The authors claim, "Unlike philosophers and writers, scientists have no reason for political or emotional attachment to their theories" (223), which makes one wonder why someone like Tipler seems so opposed to the intelligible alternative of a divine Designer (in his *World Within a World*) but then elsewhere posits as plausible the utterly bizarre "Omega Point," toward which the entire animate and inanimate universe is evolving—with self-replicating robots living on in the place of extinct humans.

Another subtle potshot at theism is the authors' remark, "The question of the precise identity of any such Grand Designer has always been a problem for any advocate of a cosmological design argument" (229). But Tipler and Silk seem to be using an inept metaphysical escape hatch to avoid the universe's theistic implications. The teleological argument only attempts to show that one Designer (according to Ockham's razor) who is powerful (not necessarily omnipotent) and intelligent can be reasonably inferred from the observable data of the universe, which is in keeping with biblical theism. There seems to be no good reason why our universe's being "unexpectedly hospitable to life" (227) does not permit one to conclude that the existence of a Creator and Designer is rational and credible.

These metaphysical incidentals, however, should not significantly detract from the book's informative discussion about cosmology.

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A CENTURY OF BIBLICAL ARCHAEOLOGY by P. R. S. Moorey. Louisville, KY: Westminster/John Knox Press, 1991. xvii + 189 pages, indexes. Paperback; $14.99.

The legitimacy of biblical archaeology as a field of study has been under severe attack. At times one wonders which side Moorey is on. At the end he does provide at least some hints of a future for the discipline, along with viewpoints of some contemporary archaeologists that could be used for a defense of sorts. After he has lamented the influence of the Judeo-Christian faith on archaeology throughout most of the book, however, one is left wishing that he had devoted even a few paragraphs to discussing the value a biblical background might have for the archaeology of Palestine — if, indeed, he sees any value. While Moorey nowhere explicitly treats his idea of the direction that biblical archaeology should take, he does provide succinct and thoughtful evaluations of individual contributions and the advantages and disadvantages of

various excavation and interpretation techniques. Furthermore, Moorey admits his bias (he is an archaeologist rather than a theologian), observing only that maybe that's not so bad since "biblical" is only an adjective qualifying archaeology.

Moorey presents the strengths and weaknesses of individuals, schools, and methodologies within an evaluative history of the development of biblical archaeology as an interdisciplinary field relating primarily to the Old Testament since 1800. Very little is included for the New Testament, because only recently has archaeology been applied in any substantive way to the NT, according to Moorey.

The strictly period by period chronological format is good for the history of archaeology, but it is bad for understanding the sites involved. When the interpretations of a site during one period are radically reinterpreted in the next period, one may have to wait for the next chapter to find out. However, the indexes of personal names and of place names will greatly facilitate obtaining an overview of one specific site or person.

The most irritating aspect of the book is the very regretful tones in which the biblical orientation of virtually all but the most recent archaeologists is cited. The recent ones are considered superior for not having any. Breasted, among the pioneers, is praised as a "remarkable exception...in advance of his time" (p. 51) because of his lack of biblical orientation. To be fair to Moorey, the sins of the "proving the Bible" enthusiasts are many and flagrant, all too often in the same category as the Paluxy "huma" footprints among the dinosaur tracks fiasco. In spite of the problems with the "biblical bias," however, one must wonder if he has ever considered the problems occasioned by the present secular bias that we see seeping in everywhere. He gives us no indication of such an awareness. Late in the book, Moorey does provide us with the views of recent scholars supporting a difference in purpose between the Bible and archaeology and a difference in types of evidence that each presents. Nevertheless, it is surely not unfair to suggest that this evaluative history is a bit incomplete without at least a brief concluding chapter discussing the relationship between the Bible and archaeology and how the two might be melded into a legitimate discipline called biblical archaeology.

Moorey has been in the thick of archaeological activity in the Holy Land and is well positioned to write a survey such as this. He is President of the British School of Archaeology in Jerusalem and Keeper of Antiquities at the Ashmolean Museum in Oxford, and author of several books on the subject, including a collaboration with Kathleen Kenyon on *The Bible and Recent Archaeology*.

A Century of Biblical Archaeology is well designed, with a rudimentary chronological table from 4,000 B.C. to the Roman Empire, three site maps, an "Index of Personal Names" and an "Index of Places." The "Brief Glossary" is, indeed, brief; but it will be valuable to those new to archaeology. The end notes and the "Select Bibliography" will give novices a start into the literature.

It is difficult to present a chronological history of archaeology that is not as dry as the dust of Palestine and as boring as reading the telephone book. However, Moorey succeeded admirably. The prose is accessible to educated people and the explanations, comments, and evaluations make it interesting and understandable.

All in all, this is an excellent book to peruse before beginning a detailed study of archaeology related to any part of the Bible. I would also recommend it to any student of the Bible who lacks a basic understanding of archaeology and its problems. It could have prevented some of the pain I have felt while listening to many a sermon. While Moorey's unquestioning acceptance of some of the prevailing interpretations, such as those of the Jericho digs, will cause problems for conservatives, all can profit from his book.

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GREAT ESSAYS IN SCIENCE by Martin Gardner, Ed. Amherst, New York: Prometheus Books, 1994. 427 pages. Paperback, $16.95.

The purpose of writing *Great Essays in Science*, according to the author, is "to spread before the reader, whether his or her interest be passionate or mild, a sumptuous feast of great writing absorbing, thought provoking pieces that have something to say about science and say it forcibly and well." As the title implies, Gardner has assembled excerpts of works from a broad spectrum of philosophers, scientists, and intellectuals. The sources from which Gardner draws these essays are varied, including chapters of books, excerpts of fiction, lectures, biographies, and articles. There are 34 essays of uneven length ranging from a couple of pages to over twenty pages. Each article is prefaced by a short introduction to the author providing the necessary context for the reader.

A few of the articles are essentially instructive. Albert Einstein provides a lucid explanation of his famous equation, in "$E = mc^2$." Jean Henri Fabre enthusiastically takes us into the world of insects through his anthropomorphically infested discussion of the sacred scarab in "The Sacred Beetle." Most of the essays, however, are devoted to examining science from political, philosophic, literary, and theological perspectives. Stephen Jay Gould undercuts any natural theology that attempts to deduce the Divine from an ethical analysis of the animal kingdom in "Nonmoral Nature" by describing the grisly practice of the ichneumon fly. The ichneumons plant their larvae into a living host, usually a caterpillar, after they have paralyzed their hapless victim. The larvae then proceed to eat their host from the inside out. Alfred North Whitehead, on the other hand, stresses the necessity of mutual dialogue and cooperation between theology and science in "Religion and Science." Whitehead examines the evolution of

science and theology in history and concludes that their mutual interplay and tension are opportunities for synthesis and advancement rather than an unbridgeable chasm. From a political perspective, scientists receive a scathing critique by the philosopher Jose Ortega Y Gasset who denounces the technician's smug confidence in his scientific understanding as a general basis for knowledge in the "Barbarism of Specialization." The future of our technologically driven society is seen from the cynical gaze of Aldous Huxley in an excerpt from his book *Brave New World*. On a more positive note, Isaac Asimov reasserts the aesthetic appeal of scientific knowledge over the naive objections of Walt Whitman in "Science and Beauty." Laura Fermi gives a fascinating, personal portrait of her husband as he leads a team in testing the first nuclear reaction in "Success."

The diversity among the essays represents both the book's greatest strength and weakness. The breadth of viewpoints is refreshing and challenging. However, the quality and relevancy of selections are uneven, thus diluting the collective impact of the essays. It seems that Gardner could have found more material from individuals who have had a significant impact on science and have successfully communicated their work to the general public. In particular, none of the pioneers of quantum physics, save Einstein, are represented, such as Heisenberg, Bohr, or Schroedinger, in spite of the fact that all of them have written important accessible works on science and its relationship to other areas of intellectual endeavor. Nevertheless, *Great Essays in Science* should leave readers with a panoramic view of the scientific landscape that should prove to be intriguing and rewarding.

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NATURE, REALITY, AND THE SACRED: The Nexus of Science and Religion by Langdon Gilkey. Minneapolis, Minnesota: Fortress Press, 1993. 204 pages, notes, bibliography, index. Paperback.

Written by the well-known author Langdon Gilkey, Professor Emeritus of Theology at the Divinity School of the University of Chicago, this book presents an erudite examination of issues at the intersection of science, theology, and nature. It is the result of a collection of earlier course lectures, addresses, and papers. Perhaps because of this origin, there appears to be a higher number of repetitive treatments than in a typical book.

The book starts with the balanced perspective, "A purely 'religious' apprehension of nature, void of any influence of the scientific understanding of nature, is indefensible. ... A purely 'scientific' apprehension of nature, void of any influence of the religious understanding of nature, is equally indefensible" (p. 1). It concludes in a similar way: "To know nature truly is to know its mystery, its depth, and its ultimate value — it is to know nature as an image of the sacred, a visible sign of an invisible grace" (p. 204). The book is presented in 13 chapters corresponding to three major sections: "Reality, Science, and Religion," " Nature, Science, and Religion," and "Nature and the Sacred." Because of the high density and elaborate prose of its presentation, it is a book to be studied carefully in small doses, not to be read through casually in recreational reading. The themes that course through this book, therefore, concern nature; the scientific knowledge of nature; and religious, especially archaic religious, apprehensions or intuitions of nature" (p. 2). The second part of this statement reveals that a major thrust of the book is a comparison of a view of nature derived from modern science with the corresponding view of nature set forth in "primal religions." It is not, therefore, explicitly a comparison of a scientific view of nature and a view of nature based on Christian theology. Positive aspects of the book are its careful avoidance of extremes into either scientism or theology-dictated "science," and its advocacy of critical realism as a viable scientific position.

Some of the main thrusts of the book can best be illustrated by direct quotations from the text itself.

> The most important conclusion of this discussion is that world and mind are inextricably correlated or mutually dependent. World does not originate from mind, as idealism had stated; by the same token, however, the world as it is known by science is not independent of mind — *a se* so to speak — but is itself in part a product of mind (p. 67).

> This book assumes ways other than empirical science of knowing what is real: through interior self-awareness, through personal and communal awareness of the other, and through intuitions of external reality that are much wider and deeper than either sensory experience or inquiry based on sensory experience (p. 86).

> My hope is that even though modern humans are participants in a scientific understanding of nature, we may learn from the archaic religions and through them enrich and expand our own modern understanding of nature (p. 102).

> God is, therefore, the name for that unlimited reality spanning the entire ordered past and the entire open future, uniting into an ongoing order achieved actuality, on the one hand, with the open possibilities of the novel future, on the other; uniting destiny from the past with freedom in and for the future (p. 203).

These quotations illustrate the character of the text: picturesque words artistically arranged. Some of these statements can be agreed with immediately, some might be understandable as poetic statements rather than cognitive propositions, and still others may seem incapable of full integration into an authentic Christian science and theology. Students of these issues should be aware of what this book claims and why.

Reviewed by Richard Bube, Professor Emeritus of Materials Science and Electrical Engineering, Stanford University, Stanford, CA 94305.

FOUNDED ON THE FLOODS by S. Hugh Paine. Walnut, CA: Productions Plus, 1993. 150 pages. Paperback; $18.00.

Paine majored in math and physics at Wheaton College and did his graduate study at the University of Chicago. After working for several years as a process metallurgist at Bell Aircraft he returned to the University o Chicago where he became a senior metallurgist at Argonne National Laboratory. There he spent fifteen years studying radiation damage to metals related to nuclear reactors. In 1960 Professor Paine became head of the physics department at Houghton College where his brother, Stephen Paine, served as president. He taught physics and earth science and began a serious study of Hebrew, until his retirement in 1976. The study of Hebrew was to gain an understanding with a sure translation basis of the critical passages of Genesis. Professor Paine recalls in the book's introduction, "My introduction to the Gap theory, however, came through an intriguing volume from Dad's uncle's library, Pember"s *Earth's Earliest Ages* (a volume I still treasure), which gave me my first taste of the Gap theory." He taught the Gap-Flood theory in essentially the form printed in this book for about ten years before his retirement.

At the urging of family, friends, and former students, Professor Paine has reluctantly agreed to record the insights he has gained from his extensive studies of the Bible, with special emphasis on Genesis, and from his teaching involvement with the earth sciences, particularly geology, for the understanding of the events of creation. In his words: "My situation is somewhat similar to that of Copernicus, who did not dare publish his work for fear of reprisals. Near to the time of his death his friends took a hand in the matter. In the same way, my 'friends' are urging me to publish my studies of Genesis" (p. 23).

A reading of *Founded on the Floods* reveals several guiding principles which were very important in shaping Professor Paine's views of origins. I understand several of these as follows:

1. He is convinced that the Bible deals with realities, not myth or fantasy; however, at times figurative language is used. In short the Bible is the record of God's historic dealings with mankind and the Bible says what it means. Professor Paine has made an intensive study of the Hebrew language to better understand that record.

2. He believes that the verified findings of the physical sciences are to be accepted if one is really interested in finding the truth.

3. He finds the "theory of naturalistic biological evolution cannot honestly be called anything but a faulted hypothesis."

4. What we believe about Creation really does matter because it affects what we believe about the Bible and about God himself.

After a Prologue the book has two main parts; "The Bible as the Ultimate Source" (50 pages) and "Science as a Reliable Source" (45 pages). These are followed by an Epilogue, 3 brief Appendices and a Postscript. "The Bible: Ultimate Source," obviously a study of Genesis, includes interesting sections such as "Difficulties in Translating Scripture," "Language Gaps and Discriminating Figurative and Literal." Professor Paine's thesis is that we must be very careful in interpreting clear statements of God's inspired Word as figurative. Further, we should not depend on English versions or commentaries but should do the hard work of reading the original language. This part of the book concludes with a discussion of Noah's flood as universal and placid.

"Science: Reliable Source" presents Professor Paine's applications of the scientific method to creation theories. He favors the Gap-Flood theory because "it is in complete harmony both with what the Bible says and the verified findings of Science." This section includes flood tectonics, age of earth and universe, the standard geologic column, and pre-Adamic hominids.

This book is important to me, not so much for its clear presentation of the Gap-Flood theory but because it represents one man's life-long search to understand God through his revealed word by study in the original language and through his creation by application of the scientific method. I close with another thought from this book: "What we believe about the Bible influences what we believe about creation, and what we believe about creation influences what we believe about the Bible. It has to be that way."

Reviewed by Bernard J. Piersma, Professor of Chemistry, Houghton College, Houghton, NY 14744

SCIENTIFIC EXPLORERS: Travels in Search of Knowledge, by Rebecca Stefoff. New York and Oxford: Oxford University Press, 1992. 151 pages. $20.00.

This is part of the Extraordinary Explorers Series for readers aged 10 and up, which includes volumes on *Women of the World* and *Accidental Explorers*. The other volumes in the series are also written by Rebecca Stefoff, who has written more than 50 other books for "young adults."

The book comprises three parts: "Pursuing Knowledge in Far Places," "Naturalists in the Great Unknown," and "Exploring New Worlds." It begins with descriptions of scientific observations made by European explorers pushing the boundaries of their known world, and moves on to explorations undertaken specifically to expand scientific knowledge (such as into The World Beneath the Waves, and Space—the Final Frontier). It is of necessity highly selective, given the scope that is treated in the number of pages here.

The writing is lively and smooth, and there is a good selection of illustrations (some in color). The intention of the book is to interest children in knowledge, specifically

in scientific knowledge and the investigations that help to discover and develop it. It fulfills this intention well, and can be recommended to young readers.

Reviewed by Dr. David T. Barnard, Department of Computing and Information Science, Queen's University, Kingston, Ontario, Canada.

ORIGINS OF LIFE, The Central Concepts by David W. Deamer and Gail R. Fleischaker, Eds. Boston, Jones and Bartlett Publishers, 1994. 431 pages, bibliography, index of authors cited. Paperback.

In the Foreword we read: "This volume is intended to provide an overview of the multidisciplinary approach that is now applied to the origins-of-life problem. Here you will find a smorgasbord of ideas: planetary accretion, impacting comets and asteroids, deep-sea hydrothermal vents, self-replicating polymers, the RNA world, and more." The editors note in the introductory section that we have "a modest level of confidence" in statements about the age of the universe and solar system. The fact is, they say, that we can only arrive at these conclusions by using deductive logic. The foundations are uncomfortably thin. Investigators often rely on "plausible" arguments using the principles of continuity, ubiquity, and robustness. Thus warned, we notice how often the words "assume," "probable," "believed," etc., appear. The writers realize that we do not know how many facts are connected. Even when selecting facts, the scientist shows a bias. Being aware of these biases makes reading this book interesting. However, the selected articles are often very technical.

Forty-six papers, published between 1908 and 1992 are reprinted in five sections: The Early-Earth Environment, Prebiotic Chemistry, Self-assembly of supramolecular systems, Energetics of life's origins, and Bioinformational molecules. Only four papers are from before 1940, forty are from later than 1950. To limit the size of the book, papers about molecular evolution, origin of the genetic code, and antiquity of life (fossils, models based on metabolic pathways and/or molecular sequence comparisons) are not included.

Included in the book is a 1929 article of J. B. S. Haldane. He tells something about the early history of scientific research. He writes that the Church was captured in the third and fourth century by a group of very inferior Greek philosophers. Since that day, views of the relation between mind and body, which Paul did not hold, have retarded the progress of science. Not only do these Greek concepts hamper science, they are dangerous for the faith of Christian scientists, some theologians say. Haldane ends his article, saying that the biochemist knows no more, and no less, about the question than anyone else.

The book is a technical book and will mainly be of interest to scientists or historians of science who work in one of the fields covered in this book. As the book consists of reprints, the letter types used in the book vary from large to very small.

Reviewed by Jan de Koning, Instructor of Mathematics, Box 168, St. Michael's College (University of Toronto), 81 St. Mary Street, Toronto, Ont., M5S 1J4, Canada.

ON THE NEW FRONTIERS OF GENETICS AND RELIGION by J. Robert Nelson. Grand Rapids: Eerdmans, 1994. xii + 212 pages, index. Paperback, $12.99.

Books of this type are certainly needed. I am sure that members of this affiliation join me in hoping that nonmembers will read books like this, and think seriously about religious questions associated with genetics. This is what the author had in mind. We, and the author, would certainly hope that some of the readership would be practicing geneticists.

Unfortunately, anyone who knows anything about genetics, and bothers to read the "I already know this part" section in the front is going to be seriously put off. I quote one of the most glaring reasons:

> ... this DNA was not proved to be the substance of genes, however, until 1943, by Sewell Wright and colleagues.... During the first decades of the twentieth century, a succession of ingenious, patient, persistent scientists endeavored to prove the chemical processes which account for physical inheritance. They worked with simple organisms such as viruses, bacteria, and fruit flies to learn how cells grow and reproduce. Among the leaders of research were T. H. Morgan, Herman J. Muller, Sewell Wright, Walter Beale, Max Delbruck, Salvador Luria, and Barbara McClintock. (p. 3)

In the first place, the late *Sewall* (my spelling is correct) Wright, though a prominent geneticist, made no contribution to proving that DNA was the substance of genes. In the second place, the organisms of choice for Wright and McClintock were not any of the simple ones indicated. In the third place, I think I know something about the history of genetics, and I have no idea who Walter Beale was. The name does not occur in the indexes of two genetics texts which have a strong historical emphasis. My guess is that this is a gross misrendering of George Beadle, but I'm not sure. In the fourth place, I don't know what "prove the chemical processes" means, and I am not at all sure that the worthies listed were explicitly working on chemical processes at all. Rather, they were doing the necessary preliminary groundwork of characterizing genes, linkage groups, and genetic mechanisms.

> The messengers are RNA or ribonucleic acid units, which are sent on a one-way only track from particular genes on DNA fragments in the pairs of twenty-three chromosomes plus X or Y sex chromosomes. Francis Crick had perceived this mechanism even before it was demonstrated in 1960 by the work of two French geneticists, Jacques Monod and Edmund Jacob, and by a young American, Marshall Nirenberg (p. 6).

This is another real howler. The twenty-three pairs of chromosomes *include* the sex chromosomes. Any normal males reading this don't have X *or* Y, but X *and* Y sex chromosomes. "One-way only track" excludes reverse transcription, which is, of course, very important experimentally, and also is used by the retroviruses, including the AIDS virus. What Monod, *François* Jacob (again, Nelson made up a scientist), and Nirenberg are noted for is important, but it is not the explanation of how messenger RNA works.

What is a geneticist reading such a mish-mash to think? My own conclusion is that I am going to be *very* careful about anything else Nelson writes. If he is so ignorant about the history and mechanisms of genetics, he may be just as ignorant about what Roman Catholics or Hindus believe about genetic engineering, and I have no easy way of checking. It is hard to imagine a geneticist going beyond the sixth page except for laughs.

What would our hypothetical geneticist find, upon reading past Chapter One, "The Frontier of Genetics?" She would find a book based, it says, largely upon two national conferences on "Genetics, Religion and Ethics," held in Houston in 1990 and 1992. These were funded by Human Genome Organization (HUGO) funds. C. Thomas Caskey, president of HUGO, was principal investigator, and the author was program director. Caskey wrote a brief Foreword, which begins "Veracity and accuracy are ideals of good science and good medicine" (viii). Indeed! I was unable to find a statement, by Caskey, Nelson, or Eerdmans, that this book is the official proceedings of these conferences, nor any reference to such a work. However, there are numerous references to the conferences, and quite a bit of the book was written by conferees, apparently. The book states that the ASA gave an endorsement of the conferences. Our hypothetical geneticist would find an introductory chapter; a chapter on genetic advances in medicine, including discussion of diagnosis, counseling, and prevention and treatment; one on social issues, with the inclusion of thinking about female perspectives and the question of the danger of knowing too much; one on human nature, and the possibility of changing it; one on personal religious positions; and one analyzing the official statements of religious bodies.

Chapter One lists six areas that religious thinkers should pay attention to: human diversity; genetic engineering; counseling and education; genetic screening; pregnancy termination; and public policy and legislation. The author includes concern about the female perspective under human diversity. I would include it as a separate issue, or place it in the last area. I have no serious quarrel with Nelson's list. However, readers looking for guidance about how to go about considering these issues will be disappointed. Has God spoken about any of them? Are there biblical principles, or historical Christian positions, upon which our reactions should be based? Nelson doesn't say.

The chapter on genetic advances in medicine has a fairly long treatment of counseling. Among other matters, Nelson points out that religious views are important to many persons being counseled for genetic reasons, but that counselors from the medical professions are ignorant of religious views, or reluctant to discuss them. On the other hand, most pastors and other religious counselors are woefully ignorant of genetics.

Some readers may wonder about the inclusion of specifically feminine concerns. However, Nelson points out that the burden of reproduction is on females, and that there aren't many female geneticists.

The chapter on personal positions includes two Jews, two Catholics, two Eastern Orthodox thinkers, a Lutheran, and a Reformed, an Islamic, and a Hindu thinker. I would fault the selection, because it doesn't include a Southern (or any other kind of) Baptist, which is the largest Protestant group. The Lutheran is a professor at Gettysburg Theological Seminary, the Reformed theologian is at Rice.

The chapter on official statements includes statements by the World and National Councils of Churches, and by the Church of the Brethren, the Episcopal Church, the United Methodists, and the United Church of Christ. Nelson makes an important statement about the World Council of Churches: "No attempt was made to undergird the practical proposals which the document recommended with a theological rationale. This was a deplorable lack..." (pp. 172-173).

Nelson is not prescriptive. He doesn't tell us what to think, thereby avoiding the necessity of providing theological rationale.

I am sure that anyone who has read this far knows that I have some serious reservations about this book. Nonetheless, it does have some value. Some of us need to think about our personal positions, and some of us need to have our denominations, maybe even our Affiliation, adopt some official positions. Reading what some others have said would be helpful in these endeavors.

Reviewed by M. M. LaBar, Central Wesleyan College, Central, S.C. 29630.

MIND FIELDS: Reflections on the Science of the Mind and Brain by Malcolm Jeeves. Grand Rapids: Baker Books, 1994. 141 pages.

Mind Fields began as a series of lectures to inaugurate New College at the University of South Wales. Addressing a broad audience, Jeeves introduces the strong link between the physiological processes of the brain and the thought of the mind. He emphasizes however that while the study of the brain offers insights into consciousness it cannot provide a full explanation. The human mind is more than synaptic activity.

What then is the relationship between mind and brain? Jeeves offers numerous analogies, particularly favoring parallels with the computer. The computation of a computer is determined by physical laws, yet one might also say that its calculations are determined by the equation it has been set to run. The two descriptions are complementary, describing different levels of the same phenomenon. As a computer program is embodied in the hardware of the computer, thought is embodied in brain activity. The mind and brain are closely related, yet not identical. As a noted neuropsychologist, Jeeves writes that the precise relationship between mind and brain is well beyond the understanding of his field at this time.

Jeeves concludes that "the science of behavior should be content to be the science of behavior. It should contribute its insights into one level of discourse, yet it should remain humble and unpretentious enough to recognize that many of the deeply significant questions of life are not psychological questions and we ought not to talk of them as if they were" (96). The book is a fine example of communicating scientific developments and implications to a general audience, while carefully avoiding an immodest "scientism."

Reviewed by James C. Peterson, C. C. Dickson Chair of Ethics and Director of the Program in Religion, Ethics, and Technology, Wingate College, Wingate, N.C. 28174.

THE TRAVAIL OF NATURE: The Ambiguous Ecological Promise of Christian Theology by H. Paul Santmire. Minneapolis: Fortress Press, 1985, re-released 1993. 272 pages.

After it first appeared in 1985, *The Travail of Nature* was capably reviewed by Dr. Stanley Rice in *PSCF* (39:1). This short "re-review" is occasioned by the books "re-release" and its continuing relevance to current discussions. Santmire offers a reasonably accessible survey of past theologians as they write on the environment. Contrary to the famous Lynn White indictment that Christianity has always been on the side of nature's despoilers, Santmire traces root metaphors of "fecundity" and "migration to a good land" that support a redemptive plan for creation and call for responsible stewardship in the meantime. In the current burgeoning of books and articles devoted to a Christian view of ecology, it is helpful to learn from that heritage. Santmire leads one to some of those treasures of insightful past reflection. Unfortunately, the book over all is often repetitive, sometimes rather loosely argued, and falsely assumes that holding the spiritual transformation of human beings as a primary concern consistently leads to harming nature.

Reviewed by James C. Peterson, C. C. Dickson Chair of Ethics, Wingate College, Wingate, N.C. 28174.

FREUDIAN FRAUD: The Malignant Effect of Freud's Theory on American Thought and Culture by E. Fuller Torrey. New York: Harper Collins 1992. 362 pages. Hardback; $25.00.

The book traces the impact of Freudianism in America during Freud's lifetime. Freudian doctrine was never popular in Europe, including Vienna, Freud's hometown, where "it was considered bad taste to bring up Freud's name in the presence of ladies" (p. 3). Freudianism was embraced in New York at the beginning of the century by some political activists, physicians, artists, and novelists. However, by 1930 the influence of Freud's theory had declined. The nature-nurture controversy revived its popularity.

Torrey discusses the popularity of racially motivated eugenics in America which led to the Immigration Act and to compulsory sterilization. One of the most prominent opponents of eugenics was Franz Boas who desperately needed some data disproving the claims of the inferiority of some races. These data were supplied largely by his two assistants, Margaret Mead and Ruth Benedict. Torrey presents their views, work, and lifestyle. He presents their fascination with Freudianism which was partially motivated by a desire to substantiate their own lifestyles. He expresses reservations about the widely acclaimed *Coming of age in Samoa*, and of *Patterns of Culture*; "both women viewed the cultures they studied through prisms tinged with political and personal concerns" (p. 82).

The Nazi atrocities in World War II contributed more than any effort of intellectuals to the dissolution of eugenics; in the nature-nurture debate nature clearly lost. The discussion now was about what influences are more important, those stemming from early childhood, or from culture. Some research projects were launched with such results as that all events of Soviet history were related to "feelings associated with swaddling" (p. 115). Freud's popularity rose not only in scientific circles, but also among the public due to regular features in the media. Also, Benjamin Spock contributed vastly to the dissemination of Freud's ideas even though Spock failed as a psychoanalyst.

Psychoanalysis also entered into the courtroom as a defense of two youngsters who murdered a boy. They allegedly "were not responsible for their actions because particular events in their childhood led to emotional immaturity" (p. 154). On the theoretical turf, Karl Menninger defended the thesis that roots of crimes should be traced to childhood experience. He advocated the renouncement of the concept of responsibility. However, in crime prevention, counseling and psychotherapy given to juvenile delinquents sometimes increased later criminal behavior, instead of reducing it.

It is astonishing that the tremendous popularity of psychoanalysis lacks any solid scientific basis. Interestingly, Freud himself criticized those who wanted any scientific validation of his theory. Torrey analyzes this lack of evidence in some detail. Some elements of Freud's theory

were disproven, and some research indicated that psychoanalysis was more harmful than beneficial. The number of psychoanalysts grew, but the rate of divorce and crime grew even faster.

The heritage of Freudianism is extremely harmful. First, it can make people ego-oriented, narcissistic individuals looking out only for their own well-being. We can only wonder "what would happen to many of the individuals in long-term psychotherapy if they spent the same hours working in community service . . . that they now spend in the eructation of childhood trivia" (p. 249). Second, Freudianism acquits people from any guilt since the worst crimes can be traced back to childhood experiences, that is, to parent's faults in rearing children.

Freudianism became an unfortunate "scientific" substantiation for self-indulgence, for enslaving people by what is animal in them, for exonerating people for all possible misbehavior by having them point their finger at their parents. Psychoanalysis may turn adults into perennial children who can do what they want and in fact should do that, lest they would become a victim of neuroses.

Freudianism, although born in Europe, is mainly an American product, permeating many facets of life. From a Christian perspective, Freudian doctrine is an encouragement to sin by removing any guilt for misdeeds as, presumably, a mark of healthy and human development. It reduces man to the animal level by giving predominance to impulses, urges, and libidal instincts. As the author indicates, it is a religion, and it has been held as such by Freud himself. Treating psychoanalysis as a scientific theory is at least a misunderstanding, if not a fatal blunder. From its inception, Freudianism was a creation of a megalomaniac personality and elevated to the status of scientific theory by people whose political and personal agenda was frequently of an unsavory quality. It is fortunate that there are such books as Torrey's. It is well-researched, competent, and exposes what the title rightfully calls the Freudian fraud.

Reviewed by Adam Drozdek, Duquesne University, Pittsburgh, PA 15282.

RELIGION AND MENTAL HEALTH by John F. Schumaker, Ed. New York: Oxford University Press, 1992. 320 pages. Hardback; $45.00.

This collection of 24 essays, written by 24 authors, is divided into these main sections: historical perspective, affective and cognitive consequences, psychosocial dimensions, and cross-cultural perspectives. Notes and references occur at the end of each chapter and an index appears at the rear of the book.

The editor, John Schumaker, is senior lecturer in psychology at the University of Newcastle in Australia and the author of *Human Suggestibility: Advances in Theory, Research, and Application*. In addition to the introduction, Schumaker has also written a chapter in this book. With three exceptions, all of the authors of these previously unpublished papers are associated with secular institutions. The international roster of contributors includes psychiatrists, psychologists, sociologists, and anthropologists. Their opinions about the interface of mental health and religion are diverse and stimulating.

The controversial relationship between religious behavior and mental health is the context in which these articles are presented. One side says religious faith has a beneficial affect on mental health because it produces hope, meaning, and purpose. The other side says religious faith has a deleterious affect on mental health because it produces guilt, repression, and anxiety. Evidence can be marshalled to support both positions.

These articles report on the theories and research associated with the influence of religion on self-esteem, well-being, sexual and marital adjustment, anxiety, depression, suicide, self-actualization, mental illness, and anti-social behavior. Considered in the discussions are women, children, the elderly, and the perspectives of non-Western religious faiths.

Some of the authors' conclusions serve as catalysts for discussion: religion endows men with power and esteem and women with helplessness and dependency (p. 51); irreligion and improvised religion divest people of pathways to psychological health (p. 65); contemporary religious people are profoundly hypocritical (p. 66); and the practice of Catholic sexual orthodoxy has been related to psychopathology (p. 81).

For anyone interested in reading about the way religion impacts people's lives, this volume would be a good place to start. The articles are packed with succinct summaries of research, trenchant insights, and suggestions for further inquiry.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

THE VARNISHED TRUTH: Truth Telling and Deceiving in Ordinary Life by David Nyberg. Chicago: The University of Chicago Press, 1993. 244 pages, index. Hardcover; $22.50.

Nyberg states briefly in the introduction that he does not intend to dispute "the truism that truth telling is very important to the development of knowledge in science and scholarship," and that we should avoid "harmfully exploitative deceptions such as consumer fraud, insider trading, the misuse of public office...." The rest of the

book, however, seeks to justify the skilled deception of self and others as important for practical moral living.

According to Nyberg, it is part of easily observed human nature to deceive ourselves and others. Since this trait is omnipresent in human beings, it must have been bred into us by the selective pressures of evolution. Therefore, it must be serving an important part in our survival. In particular, deception is necessary for social stability and individual mental health. For Nyberg, lying is sometimes necessary to show care and protect feelings that are foundational to trust in relationships. "To live decently with one another we do not need moral purity, we need discretion — which means tact in regard to the truth." Kindness and lies are worth a thousand truths. We also must consistently deceive ourselves. "The whole of life is too much to take." "Given the distance between what we are and what we wish we were, some amount of other-deception and self-deception is an essential requisite for carrying on." "Self knowledge is always bad news," so "we lie, even to ourselves about ourselves, to give life meaning."

For Nyberg, who assumes a materialistic evolutionary model, there are no moral standards beyond what human beings create and the only real value is survival. Morality is simply a survival strategy that we human beings have devised to help us live with ourselves and each other. Moral education then is learning to recognize those "useful moral principles" that support survival. The one resulting principle that Nyberg specifically states is that people should seek to avoid pain and not cause too much harm. Applied to deception, one should tell the truth if it seems to avoid harm, lie if it does not.

If Nyberg is correct about the needed capacity for self deception in human beings, can we trust ourselves to appropriately choose when it is appropriate to lie to avoid pain? And why create for ourselves even this standard? Nyberg does not say, although the implication may be that excessive self interest may limit the chance of cooperation with others that is beneficial to one's survival. But working from a materialistic evolutionary model, why affirm even survival?

It is not only here that arguments are left hanging. At the book's foundation is a constantly repeated and false dichotomy between deception and total disclosure. Since total disclosure is not always necessary or even possible, the only alternative, deception, must be acceptable. "Deception" is defined so broadly that one of Nyberg's examples of deception is of a professor praising the good she sees in a student's effort without specifically enumerating at that point everything that could be improved. Since this "deception" is acceptable, many other kinds of deception must be as well. He claims our choice is either "unworldly openness" or "cunning," absolute truth telling or deception. One must either be a "hedgehog" that tells the truth absolutely or a "fox" who manipulates truth and deception to best advantage.

The book is also riddled with straw man arguments. At least Nyberg does cite arguments for truth telling such as those of Sissela Bok, but burlesques them to such extremes that, of course, they no longer make sense. For example, he attacks what he calls "The Good Person Fallacy," that someone who is observed to do good is a good person, hence probably more worthy of trust. Nyberg writes that since people who do good things sometimes do bad things, there can be no expectation of better choices from one person to another. Certainly the Christian tradition is open about good people making bad choices. From Abraham's lie that ensnared him and Sarah, to Paul rebuking Peter, the Biblical tradition often points out respected people acting inconsistently. However, that does not eliminate the basic judgment that we all depend on, that people who have been trustworthy before are more likely to be trustworthy again.

In our interdependent society, we depend on the choices and word of strangers, even in matters of life and death. I have no idea who is driving the car coming towards me at fifty miles per hour on a two lane highway nor who is protecting the safety of the tap water in my home. I depend on others to do what they have promised to do even when I am not watching them and it would be easy to deceive me. If one cannot depend on others to tell the truth and do what they say they will do, it becomes increasingly difficult to cooperate with one another, and ironically more difficult to deceive. Deception is always parasitic. It can only work if there is an expectation of truth. If lying becomes accepted or expected, it no longer works, and communication and cooperation break down. Nyberg alludes to this himself when he writes about deliberate deception that "I think our difficulty in talking frankly about it stems partly from our tacit understanding that to do so would often place us at a practical disadvantage."

Nyberg says he is merely stating with candor what everyone does any way and must do to survive socially and with oneself. We can at least appreciate his candor, that is if he is actually choosing to be candid. How would we know? Nyberg is currently a professor in the Graduate School of Education at the State University of New York at Buffalo.

Reviewed by James C. Peterson, C. C. Dickson Chair of Ethics, Wingate College, Wingate, NC 28174.

CANCER AND FAITH by John Carmody. Mystic, CT: Twenty-third Publications, 1994. 144 pages. Paperback; $9.95.

To benefit from this book, the reader does not have to experience cancer. All that is required is a thinking human being who can contemplate the mysteries of existence. John Carmody is such a human being. In April 1992, he was diagnosed as having multiple myeloma, a cancer of the bone marrow. Presently, multiple myeloma

is not curable. The average survival following diagnosis is about three years.

In this book, Carmody shares his reflections on how his cancer interacts with his Christian faith. His impressions make up forty-nine brief chapters, some of which were written a year after the therapy which produced a partial remission.

A quote from the preface summarizes the book's tone: "I have hated having cancer, but my faith has chanted that my hatred ought to stay measured. If God has determined that myeloma should shape my last years, who am I to kick against such a goad? If I cannot find blessings in this disposition of God, occasions for insight and purification, my faith is unimpressive."

After reading this book, the reader may conclude, as I did, that Carmody has quite an impressive faith. Carmody's prospect of imminent death enabled him to separate the temporal from the eternal. His insights can help the reader courageously face death—and life. Science can contemplate the mysteries of God's creation, but only Christian faith can conquer death.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

BIBLESOURCE 2.0. Grand Rapids, Michigan: Zondervan Publishing House, 1994. Bundle Pack price in DOS and Windows: $79.95.

Traditionally, *Perspectives on Science and Christian Faith* limits its book review section to reviews of books. However, with the increasing availability and use of computers, an occasional review of software is appropriate. Perhaps the best place to start is with a review of software designed to make Bible study more efficient and effective.

Zondervan's software for the PC, Bible Source 2.0, is now available in eight different modules including the New International Version with its study notes and exhaustive concordance. Features include: comparisons at a glance, customized Bible study, fast word and phrase searches, and record insights. A Windows' version is also available. Toll-free technical support service should reduce user problems. Realizing that not all computer users are PC equipped, Zondervan also issues macBible 3.0 for Macintosh. macBible 3.0 can run on networks and interact with other programs compatible with Apple Events and Apple Share.

Members of the American Scientific Association who engage in writing or speaking will find Zondervan's Bible software very helpful. It lessons the need to have books competing for desk space with computers, printers, and other paraphernalia. Zondervan is the first Christian publisher to create a software department. It is to be commended for making the Bible more accessible to Bible lovers and scholars.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

THE CULT EXPERIENCE: An Overview of Cults, Their Traditions and Why People Join Them by John J. Collins. Springfield, IL. Charles C. Thomas Publisher, 1991. 133 pages, bibliographic essays, index. Hardcover; $29.75.

"A cult is a religion with no political power." Is it as simple as journalist Tom Wolfe proclaims? No, but neither is it as bewildering as the vast and expanding literature on religious cults would indicate. In *The Cult Experience*, author John Collins does a masterful job in distilling the essence of that literature into an understandable set of criteria.

The book begins with the difficult problem of defining a cult, placing it somewhere between a religion and a sect in character, but with attributes that set it apart from each. This is followed by the detailed history of three American cults: Scientology, Hare Krsna, and Divine Light Mission. He then examines what kind of people join cults, what motivates them, the process of conversion into cults, and the means of escape. The growth stages of cults and their types are then analyzed, followed by a comprehensive examination of cults world-wide. Finally, he draws the entire book to a close with detailed bibliographic essays on the topic of each chapter. Many readers will find these essays to be the most valuable part of the book, saving untold hours of library searching to find a topic of specific interest. Collins presents his discussion in a completely secular manner, avoiding the sectarian character of books such as Martin's *Kingdom of the Cults*. He avoids hyperbole and just presents the facts.

It is very difficult to do justice to the true quality of this book in a descriptive review. It cries out for a unique approach to appreciate its value. To that end, I propose to use it as a guidebook to examine a rather controversial question and one that is rarely raised in any book on cults. Is Catholic Mariolatry a cult?

The Catholic devotion to Mary reaches back almost two millennia, to the early centuries of the Church. An outgrowth of this devotion has been the development of groups within the framework of the church that have focused on Mary as an intermediary between mankind and Jesus. Such groups have been either clerical or secular in nature, and have almost always maintained allegiance to the Pope and the magisterium of the Church. Even the most recent Popes have been devoted to Mary. But in recent years, Mariology has taken what appears to be a distinctly cultish turn into Mariolatry, with numerous visionaries relaying messages from Mary to mankind. If Mariolatry is a cult, it is hard to imagine any cult that

has been as successful, drawing millions of devotees each year to sites of apparitions such as Guadalupe and Lourdes, and hundreds of thousands to apparition sites that are not even recognized by the Church. Some authors such as Michael Carroll in *The Cult of the Virgin Mary*, and Marina Warner in *Alone of All Her Sex: The Myth and the Cult of the Virgin Mary*, have assumed a simple definition such as a "collectivity centering around a real or imaginary figure whose followers believe that their lives are made better ..." Such a definition is far from satisfactory, since all of Christianity could then be classified as a cult. Let us see how we can use Collins' book to examine this dilemma.

Our first approach will be to characterize Mariolatry on a sliding scale between a church (an established mainline religion that shares the values of the surrounding secular world) and a sect (a group that is often formed within an established church, but is less restrained and more withdrawn from society and its values). It is at this point that classic Mariology, which is an integral part of Catholicism, will no longer be considered. However, modern Mariolatry, with its charismatic visionaries and calls for renunciation of worldly evils, falls distinctly at the sect end of the scale. Mariolatry fulfills several attributes of a cult such as an authoritarian structure (the visionary leader), a regimentation of thought, a renunciation of secular society as corrupt and evil, and a belief that only members are gifted with the truth. Other characteristics of cults that Mariolatry seems to satisfy are a search for mystical experiences, healing, chanting and meditation, a sacred center of worship, and sacred objects. But at the end of our evaluation, we come to a decision point. Sects develop out of churches and represent a kind of renewal attempt. Sects are something new within an established tradition, while cults involve innovation. Even though Mariolatry seems to fulfill most of the characteristics of a cult, as long as the teachings of the visionary are not contrary to the Faith, the followers cannot be classified as members of a cult.

I have used only one chapter out of *The Cult Experience* in this evaluation, but the clear and structured nature of the book have rapidly lead me to an answer (albeit a controversial one). This is one book that anyone with the slightest interest in the cult phenomena should have on their bookshelf.

Reviewed by Michael Epstein, Chemical Science and Technology Laboratory National Institute of Standards and Technology Gaithersburg, MD 20899.

ALL OF ONE PEACE: Essays on Nonviolence by Colman McCarthy. New Brunswick, NJ: Rutgers University Press, 1994.

McCarthy is a writer, teacher, runner, vegetarian, pacifist, and bicyclist. He is also described as "the liberal conscience of the *Washington Post*," a publication for which he has written 25 years. This book is a result of his twice-weekly syndicated columns published during the past five years.

This is a peaceful and gentle book; it is also a provocative and incendiary one. McCarthy can be both benign and aggressive. On the one hand, McCarthy seeks to win readers to his viewpoint by a low-keyed, factual, and reasoned approach. On the other hand, McCarthy reveals his outrage on controversial issues by using telling statistics, moving examples, and scathing sarcasm.

Above all else, McCarthy is a pacifist. He speaks forth fervently in favor of peace and in opposition to a culture of violence. In addition to his syndicated columns, McCarthy also spreads his viewpoints by attending rallies, teaching high school and college classes, and contributing his time and money. He complains that students know "more about the Bataan death march than Ghandi's salt march."

This paragraph from the preface catalogs McCarthy's various causes:

> Saying no to the military ethic that saw the United States kill people in Grenada, Libya, Panama, the Gulf and Somalia, or dissenting from the legal violence that destroys 1.5 million fetal lives a year, or protesting the killing of ten million animals a day for food, or condemning U. S. sales of weapons to 142 of the world's 160 government — or stationing troops in 62 nations — not much of that is on display.

He is right, of course, that relatively little press is given to pacifism, or vegetarianism, or arms' sales. But in the United States, McCarthy and those who share his concerns are in the minority. Whether his views are biblical or not, each reader must decide. Here is what McCarthy believes: "Animals in the stable at Bethlehem were a vision of the peaceable kingdom. Among theology's mysteries, this ought to be the easiest to fathom."

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761

Letters

Emberger on Evil

If the value of a paper is judged by its ability to stimulate thought despite whether one may espouse its thesis, then Gary Emberger's "Theological and Scientific Explanations for the Origin and Purpose of Natural Evil" (*PSCF*, Sep 1994) meets this criterion for me. His paper was an encouragement to reexamine four important aspects of the relationship between theology and science.

(1) Most importantly, the issue of theological authority arises with Emberger's acceptance of the Augustinian notion (later held by C. S. Lewis[1]) that fallen angels account for natural evil. Certainly this approach is attractive since God appears to be absolved of any responsibility. However, it lacks a firm biblical foundation. To be sure, as Lewis notes, this position once had wide appeal in the Church, but a distinctive of Reformation theology worthy of consideration is the primacy of the biblical text in the construction of theological doctrine. I would suggest that the Augustinian fallen angels thesis with its far reaching implications is too important a doctrine to be upheld without solid biblical support.

(2) The fallen angels theory has serious implications for a number of scientific disciplines. As Emberger correctly concludes, if physical and biological evils are due to the fallen angels, "then scientific explanation for the origin of those events will always be incomplete" (p.158). In essence, this position is like the God-of-the-gaps theory, and it bears the problems of that theory. This is not to say I am philosophically opposed to a God-of-the-gaps view, but the greatest difficulty with this position is establishing the reality of a "gap" in nature and being certain that it is not a function of a scientific discipline's ignorance. More specifically, consider comparative odontology and my research regarding the evolutionary implications of dental embryology.[2] Currently, I am examining the origin of the upper canine, the prominent tooth positioned on the maxillary bone near the premaxillary-maxillary suture. This long, sharp, and recurved tooth is usually featured in carnivores and is used for puncturing and slashing prey. Recognizing Emberger's (and in particular Lewis's) contention of the evil nature of carnivory, he probably would attribute the appearance of this killer tooth to the activity of fallen angels. But appreciating some of the latest work on the mechanisms of developmental biology, an argument employing completely natural mechanisms could possibly be made for the appearance of an incipient canine as early as the late Pennsylvanian-early Permian with **Paleothyris** and **Hylonomus** followed by full blown manifestations of this tooth in the early mammal-like reptiles (e.g., **Archaeothyris**).[3] To emphasize this point even further (and maybe to push it too far), should I as a committed evangelical and a scientist announce to my scientific colleagues that attempts at explaining the origin of the maxillary canine with natural mechanisms are in vain since we cannot quantify the activity of fallen angels in a test tube?

(3) The importance of biblical hermeneutics, as reflected in the exegesis of the early chapters of the Book of Genesis, is clearly demonstrated in Emberger's theodicy. He quickly dismisses "recent creation" (i.e., Young Earth Creationism) as "biblicist," and even charges that this position is "presumptuous" for rejecting an old earth. Instead Emberger appears (though he never directly states it) to espouse some concordist formulation between the scientific record for an old earth and Genesis 1 (maybe Day-Age?). However, he clearly upholds a literal "originally perfect creation" upon which fallen angels launch their ministry of corruption and a literal Adam and Eve. The question quickly arises, though, as to why these elements of Emberger's exegesis are not also deemed as "biblicist." Not only is this an apparent inconsistency in his hermeneutical program, but like all attempts at concordism it fails under the weight on serious scrutiny.[4] For example, when exactly is the paradisiacal state manifested (i.e., a time free of natural evils like carnivory), and what is the biblical support for it? If the dental fossil record is employed as a criterion, then Emberger would have to place this period at least as early as the Devonian (408-360 million years ago) with the flesh-eating cladodont sharks[5]—supposedly chondrichthyans corrupted by fallen angels who were instrumental in the development of this primitive fish's slashing dentition. That is, since sea life was created on the fifth day/age of creation, the paradisiacal state would have to be hypothesized sometime during or prior to that period. Historical theology, which generally places the paradisiacal period between the sixth day of creation and the fall, fails to offer a hint of support for such a view. Moreover, the biblical text records that God gave the vegetarian mode of diet to "everything that has the breath of life in it" after He had created humanity (Gen. 1:30). However, the fossil record clearly reveals that carnivory comes well before the appearance of the first humans.

(4) Finally, the principle empowering Emberger's theodicy is simply stated: "It is only necessary to show that evil ultimately does not originate with God, and that he has his purposed for allowing it to continue" (p. 157). Positioning God a step away from the origin of evil may prove mitigatory for some, but it would clearly question the responsibility and compassion of such a bystander all-powerful Deity. On the other hand, the Irenaean theodicy as Emberger exposits it (and certainly seems to appreciate) claims that the presence of evil is God's wise and righteous will for humanity's development and perfection.[6] I can only speculate that should Emberger reconsider what I deem are biblicist elements in his exegesis of the early chapters of Genesis, he may retract his contention that Irenaeus fails to "[do] justice to the veracity

of the biblical revelation," and come to fuller acceptance of the Bishop of Lyons' view.

To conclude, I quite appreciate Gary Emberger's contribution to *PSCF*. As never before he made me aware of how theodicy plays a critical role in the origins debate, and further investigation into this theological concept will certainly advance our understanding of the relationship between our science and our faith.

Footnotes:

[1]Lewis, C. S. (1962). *The Problem of Pain*. NY: Macmillan. pp. 122-143.

[2]For an introduction on the current synthesis between evolutionary and developmental biology see Hall, Brian K. (1992). *Evolutionary Developmental Biology*. London: Chapman and Hall.

[3]Clark, J., and Carroll, R.L. (1973). *Romeriid reptiles from the Lower Permian*. Bull. Mus. Comp. Zoo., 147:353-407. Carroll, R.L. (1988). *Vertebrate Paleontology and Evolution*. NY: Freeman, 1988. pp. 193-194, 363.

[4]A theme of my doctoral dissertation on the impact of Darwinism on 19th century evangelicals is that concordist theories like the Day-Age Theory generated little scholarly discussion and were short-lived in academic circles. See Lamoureux, Denis O. (1991). *Between "The Origin of Species" and "The Fundamentals": Toward a Historiographical Model of the Evangelical Reaction to Darwinism in the First Fifty Years*. Ph.D. Dissertation. Wycliffe College at the University of Toronto and the University of St. Michael's College, Toronto School of Theology, Toronto, Ontario.

[5]Carroll (1988), pp. 67-68.

[6]See Ward, Keith, and Allen, Diogenes, "Natural Evil and the God of Love," in Marilyn Adams and Robert Adams (1990) *The Problem of Evil*. Oxford: Oxford University Press. I owe this reference to Rev. Chris Barringar.

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On Clark

Our compliments to you for the selection of Mr. Clark's article for inclusion in *PSCF*. It admirably meets your objective of reaching a general audience, one that finds ". . . a path that falls between superficiality and the formidable rhetoric of a biochemical or philosophical piece."

On September 22, 1994, Professor Phillip E. Johnson was the principal lecturer at a seminar conducted at the Institute of Science and Christian Faith. Professor Johnson's lecture was complementary to Clark's article in which he masterfully presented a potentially esoteric lecture to a general audience. The title of his presentation was "Metaphysical Naturalism: The Established Religious Philosophy of America." We have distilled the essence of Johnson's lecture and suggest that it may be of interest to ASA's Journal readers.

The main point in the creation debate, according to Johnson, is that the metaphysical naturalist and theist both have a creation story. Therefore, the question is not Creationism vs Darwinism or the Bible vs evolution, but to which creation story does one subscribe? The metaphysical naturalist begins with matter in mindless motion. He contends that nature is all there is. Therefore, creation is accomplished through an impersonal, blind, purposeless process. Man is an unplanned, cosmic accident accountable to no one but himself.

The theist, specifically the Christian theist, begins history with pre-existing intelligence. He holds that the Creator, existing outside of nature has brought into existence the universe and all therein, through the power of his Word. Therefore, creation is accomplished through a process involving intelligence, guidance, and purpose. Man is a planned, purposeful being accountable to his/her Creator.

These diametrically opposed views are based on philosophical assumptions. It is necessarily important that these assumptions be made explicit if any fruitful debate is to be undertaken. It is essential that we have clarity on this "main point." Furthermore, it is essential that Christian theists, ala creationists, focus on the "main point" when contending for the biblical-creation view. Other issues, such as the chronology of Genesis, are secondary or peripheral, and must not be allowed to hold center stage as we contend for the "Faith."

The "main point" is set forth by John the Apostle where he declares that "Before the world was created, the Word already existed; he was with God, and he was the same as God. From the very beginning the Word was with God. Through him God mad all things; not one thing in all creation was made without him. The Word was the source of life, and this life brought light to mankind. The light shines in the darkness, and darkness has never put it out."

The issue, it would seem, is not whether one view is religious and the other secular, but that fundamentally both are essentially religious. As Johnson suggests, its a matter of choosing one's "Creation Story."

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The American Scientific Affiliation (ASA) is a fellowship of men and women of science and disciplines that can relate to science who share a common fidelity to the Word of God and a commitment to integrity in the practice of science. ASA was founded in 1941 and has grown significantly since that time. The stated purposes of the ASA are "to investigate any area relating Christian faith and science" and "to make known the results of such investigations for comment and criticism by the Christian community and by the scientific community."

Science has brought about enormous changes in our world. Christians have often reacted as though science threatened the very foundations of Christian faith. ASA's unique mission is to integrate, communicate, and facilitate properly researched science and biblical theology in service to the Church and the scientific community. ASA members have confidence that such integration is not only possible but necessary to an adequate understanding of God and His creation. Our total allegiance is to our Creator. We acknowledge our debt to Him for the whole natural order and for the development of science as a way of knowing that order in detail. We also acknowledge our debt to Him for the Scriptures, which give us "the wisdom that leads to salvation through faith in Jesus Christ." We believe that honest and open study of God's dual revelation, in nature and in the Bible, must eventually lead to understanding of its inherent harmony.

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Founded in 1941 out of a concern for the relationship between science and Christian faith, the American Scientific Affiliation is an association of men and women who have made a personal commitment of themselves and their lives to Jesus Christ as Lord and Savior, and who have made a personal commitment of themselves and their lives to a scientific description of the world. The purpose of the Affiliation is to explore any and every area relating Christian faith and science. *Perspectives* is one of the means by which the results of such exploration are made known for the benefit and criticism of the Christian community and of the scientific community.

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LOCAL SECTIONS

of the ASA and the CSCA have been organized to hold meetings and provide an interchange of ideas at the regional level. Membership application forms, publications, and other information may be obtained by writing to: American Scientific Affiliation, P.O. Box 668, Ipswich, MA 01938-0668, USA or Canadian Scientific & Christian Affiliation, P.O. Box 386, Fergus, ONT N1M 3E2, CANADA.

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