

PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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Technological Pessimism

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

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3. Regular Papers should be accompanied by an *Abstract* of not more than 100 words.
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5. References and footnotes should be collected at the end. Each note must have a unique number.
6. Figures or diagrams should be clear, black and white, line ink drawings or glossy photographs *suitable for direct reproduction*. Captions should be provided separately.

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The ASA In Transition

July marks the changing of the guard in the Executive Director's chair as Houghton College biologist Donald Munro moves to Ipswich to assume the leadership position. Retiring Executive Director Robert Herrmann took over in May 1981, establishing the ASA office first in his home and then in a suite at the Marketplace Building in Ipswich, Massachusetts — a long leap from the office in Elgin, Illinois, headed by his predecessor Bill Sisterson. Change has already begun, with Dennis Feucht assuming the *Newsletter* editorship from Walt Hearn in 1993.

Bob's 13 years have seen the ASA expand in influence and in services to the membership and the Church. The major challenge has always been the budget, with pressure to bridge the gap between membership income and expenses. There has never been a lack of ideas for worthy projects, but funding them continues to be difficult. Happily, the ASA community has generously responded to the challenge, with Bob's prodding.

Don and the Executive Council face significant challenges in the coming months. These include completion of the "Space, Time and God" TV series; expanding the membership; completing service projects; and the need to develop a more substantial financial base.

Two decades ago the ASA faced little competition from other organizations. In subsequent years some disciplines have created their own organizations and publications which have caused some erosion in our membership base. Several local sections have recently lost leadership with the result that fewer programs are available to maintain regional interest. For ASA and CSCA to be really influential in nations of such large land mass, strong local section activity is essential.

Commissions and committees find it difficult to meet when such long distances are involved. Perhaps the electronic highway can enable better exchange of ideas. We need to explore ways that computer communication can aid in dialog within ASA, the Church and the broader scientific community. I am currently a "lurker" on two electronic mailing lists. One, called "faith-learning," based at Baylor, has emerged as a medium for high level discussion of important questions for Christian intellectuals. The other group, "talk.origins," has less appeal because of a tendency for name-calling. We need to consider whether ASA should provide such a service, possibly in a managed form which would offer various categories of discussion reflecting the wide range of disciplines represented by our organization. To do this right will take considerable volunteer time and financial support.

Younger members are encouraged to help with continuing projects and developing new ways of doing things. All of us should seek to recruit new members. The ASA office will be happy to send an information packet and sample journal to prospective members. If Don is to see success in his tour of office, it will come only with the whole-hearted support of members.

— J. W. Haas, Jr.
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In This Issue

This environmental issue features papers from the 1993 Annual Meeting. Keynoter Cal DeWitt joins with Dick Bube and Al Truesdale to offer thoughtful contributions which reflect on scientific and theological questions and on the difficulty that evangelicals have had in coming to grips with ecological issues. Robert Wauzzinski evaluates various Christian responses to modern technology. John Wiester's Communication details the difficulty of dealing with some establishment figures in science. David Livingstone comments on Adrian Desmond and Jim Moore's important biography, *Darwin*. Moore will comment on this analysis and other reviews in our next issue.

Ted Davis leads the Book Reviews with his Essay Review on two works dealing with the role of Christianity in early period of modern science. We close this issue with a series of letters commenting on previous articles. We encourage your reactions to the work of our authors.

Christian Environmental Stewardship: Preparing the Way for Action

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While convicted by environmental degradation and scriptural teachings on environmental stewardship, we may find ourselves hesitating to do what must be done. Stumbling blocks and pitfalls often prevent Christians from engaging in stewardly care and reconciliation of creation. Once identified and recognized, these things need no longer stand in our way, and we can proceed to act on our knowledge and beliefs about creation and the environment. In doing so, we can build upon a three-part framework: (1) Awareness: seeing, identifying, naming, locating; (2) Appreciation: tolerating, respecting, valuing, esteeming, cherishing; and (3) Stewardship: using, restoring, serving, keeping, entrusting.

We can nurture our awe and wonder for our Creator through study of God's provisions for creation. But as we do so, we soon are confronted with the ongoing and accelerating degradation of the earth that in many ways reflects human disregard and abuse of these provisions.¹ Responding to this degradation by searching the Scriptures, we may bring ourselves to the point where we are ready to act on what we know and believe.

But there is a problem...

The problem is that many of the things we know we should do, we just don't do, including the care and keeping of creation. There are very good reasons for this. First, there are things that stand in our way and make us stumble — so much so that we might never get started. Second, there are holes in the road that are so big that they not only give us a bump, but even consume us, so that our intended journey stops abruptly well before we get to where we were heading. Thus, in this paper I identify some stumbling blocks that often prevent Christians from taking action on our scientific and ethical knowledge, and also a pitfall that may capture us along the

path of creation stewardship. This is followed by a suggested framework for putting our knowledge and beliefs into practice.

Stumbling Blocks to Creation's Care and Keeping

Some of the troublesome stumbling blocks in the way of creation-keeping discipleship are ones we ourselves have invented. Others have been devised by our friends, and still others by enemies. These we must identify and clear from the path of the service to which we are called. What are these stumbling blocks? Here are some of the major ones, each followed by a response that might help us remove it from our path of creation-stewardship.

This paper is based upon the keynote addresses given by the author to the 1993 Annual Meeting of the American Scientific Affiliation held in Seattle, Washington, August 6-10, 1993 on the theme, "Caring for Creation: A Christian Perspective on the Environment." It is based upon an earlier version of this material published in the Evangelical Review of Theology 17(2):134-149, 1993 and is also being published (1994) as part of a six-part study book for churches, Earthwise, published by CRC Publications, Grand Rapids, Michigan. Previously published portions reprinted with permission.

(1) This world is not my home, I'm just passing through. *Since we're headed for heaven anyway, why take care of creation?*

Those who truly believe in Jesus Christ (as Creator, Sustainer, Reconciler, and Redeemer), while receiving the gift of everlasting life (cf. Mark 16:16), have bodies that are short-lived — much shorter-lived than creation itself. But temporal as our bodies are, we still take care of our appearance and health; we comb our hair, brush our teeth, try to stay physically fit, and employ the care of physicians and nurses. Similarly, we care for our buildings. Construction of skyscrapers, for example, now is approved in many of our larger cities only when a demolition plan is filed along with the construction plan (to allow their safe destruction a hundred or so years later). Thus, even structures whose destruction is planned are still protected and maintained with security provisions and custodial care. Biblical teachings reinforce our responsibility for the care and keeping of creation. (1) They include teachings for stewardly life (see box beginning on page 88), (2) they give the grave warning that those who destroy the Earth themselves will be destroyed (Rev. 11:18), and (3) they lead us to consider the importance of learning to take care of things in this part of eternity in preparation for the care of things with which we will be entrusted later. A pastor friend of mine sums up this third point by saying, "we should so behave on earth that heaven is not a shock to us!"

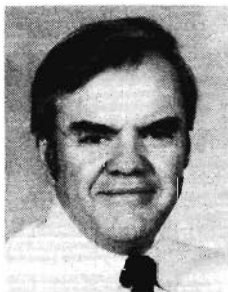
(2) Caring for creation gets us too close to the New Age movement. *Isn't concern for the environment and working for a better world what the New Age movement is all about? I don't want people to think I am a New Ager.*

The Bible, of course, has the corner on the Kingdom of God, not the New Age movement.² For thousands of years now, believers have looked forward to the coming of the kingdom of God, and it is for this they continue to look when they pray "Thy king-

dom come..." Many, perhaps most, people in the New Age movement have never really been presented with the good news of the Kingdom of God, and while they are talked about very much in various discussion groups and Christian publications, most remain unapproached with the gospel. In the meantime the "new agers" are doing what they can to invent and impliment their own vision for a world of peace and harmony. Paul's example in Athens should encourage us to move from criticism and church-basement discussions to evangelical testimony and explication. As Paul explains to the people of Athens about their altar to the unknown God,³ so should those who know, study, and reflect upon the meaning of the Kingdom of God explain its meaning to those who hope for a new age. Our task is not first of all to worry about those among our very numbers "with New Age tendencies" but to bring the gospel to those who are seeking, so that what they seek need no longer be invented, for "how can they hear without someone to preach to them?" (Rom. 10:14b). We and they need earnestly to pray, in word and deed, "thy Kingdom come, thy will be done, on Earth..."

(3) Respecting creation gets us too close to pantheism. *If you care for plants and animals, and especially if you value the keeping of endangered species, you are close to worshipping them as gods.*

Pantheism (the idea that all things are god), and panentheism (the idea that all things are in God), are growing problems. Surprisingly in this age of science, worship of creatures is increasingly practiced. Thus, as we convey the good news, we must be clear that God is the Creator and that the awe and wonder we develop from the study of creation is to be directed to the Creator, not to creation (cf. Rom. 1:25 and Acts 14:14-18). But the existence of this danger of confusing the Creator and the creature does not mean that we may deny the creation or neglect taking care of creation. The example of Noah is instructive: Noah cared for the creatures and pre-



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served the species endangered by the flood not because they were gods, but because God required it — God's will and requirement is to keep the various species and kinds alive on the earth (Gen. 6-9). When it comes to masterpieces created by human artists, respecters of Rembrandt keep and take care of Rembrandt's paintings; how much more so should respecters and worshippers of the Creator keep and take care of the Creator's works? How much more so should they be about demonstrating God's love for the world (Psalm 104, John 3:16), bringing to God the grateful love and glorifying respect that is due the masterful Creator of all these things?

(4) There are too many worldly people out there doing environmental things. *If people who don't share my beliefs in God and Jesus Christ are working to "save the earth," I know it can't be right for me.*

God called Cyrus into divine service. We read in Isaiah 45 that unbelieving Cyrus was anointed to do God's work, even though he did not acknowledge God.⁴ The Bible makes it clear that if God's people are unwilling or unable to do God's work, God sees to it that the work gets done nonetheless. As we should not deprecate Cyrus for doing his God-given work, we must be careful not to deprecate any worldly people out there who clearly are doing God's work. More importantly, we must not excuse ourselves from our God-given task as stewards of God's creation if we see those who do not acknowledge God doing God's work.

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God's people are unwilling or
unable to do God's work,
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done nonetheless.***

It is sobering to know that God anoints unbelievers to do Kingdom work. "It is I who made the earth and created mankind upon it...I will raise up Cyrus in my righteousness..." says the Lord. "I summon you by name and bestow on you a title of honor, though you do not acknowledge me...so that from the rising of the sun to the place of its setting men may know there is none besides me" (Isa. 45). We need not join any cause just because the world thinks it interesting, exciting, or important; but we must be obedient to God. Not only must we, as the children's song says, "Dare to be a Daniel, dare to stand alone," but we also must "Dare to stand with

Cyrus," dare to stand with unbelievers who are doing God's work.

(5) We need to avoid anything that looks like political correctness. *Being "politically correct" these days means being pro-abortion and pro-environment, and I'll have nothing to do with that.*

What others are doing is not the standard by which we must live. We must live by the word of God.⁶ We may not neglect doing God's work because others who attempt to be "politically correct" are doing some things that are God's work. If our obedience to God makes us look "politically correct," so be it; it is God whom we serve and obey.

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Thus, people who identify themselves as "politically correct" may advocate saving uneconomic species from extinction. This should not deflect our attention from God's command to Noah and God's interest in preserving the creatures and keeping creation; it should not prevent us from being faithful as Noah was; it should not prevent us from acknowledging in word and deed God's covenant with all the creatures, with all life, and with the earth (recorded repeatedly in Gen. 9:10,11,12,13,15,16, and 17).

(6) Caring for creation will lead to world government. *If we tackle global environmental problems, won't we have to cooperate with other nations, and that will help set the stage for world government?*

There is no doubt that cooperation will be necessary in order to address many of our environmental problems. Migrating birds, for example, do not recognize international boundaries, and whales migrate across the high seas. Therefore, their care and keeping requires cooperation. That this does not have to lead to world government is illustrated by the work of the International Crane Foundation (ICF) through whose work cooperation has been achieved between Russia and China, and between North Korea and South Korea, in the keeping of wetland habitats and birds.⁷ Preserving migratory cranes has led to cooperative care of creation, but neither Russia and China, nor North and South Korea needed world government to achieve the mission of the stewardship of these birds. Seeking God's Kingdom is first for ICF's Director, George Ar-

chibald, and should also be for any who take seriously the word of God, who take seriously their prayer, "thy Kingdom come..."

(7) Before you know it, we will have to support abortion. *Because of the relationship between environmental degradation and the growing human population, we will soon find ourselves having to accept abortion as a solution to environmental problems.*

Our obligation and privilege to care for God's creation does not give us license to use whatever means we have at our disposal to address environmental problems. For people who work out of a biblical ethic, both the means and the ends are important; both must be chosen and applied in obedience to God. The fact that many people use and attempt to justify abortion in terms of controlling human population does not thereby excuse Christians from acting on their God-given responsibility for stewardship of their own lives and bodies, for care for other creatures, and to address issues of human population. Illicit means exercised by some or many are no excuse for neglect of creation stewardship. On the contrary, they are the occasion for pointing the way in obedience to God to keeping creation (Gen. 2:15) and creation's blessed fruitfulness not only for people (Gen. 1:28) but the blessed fruitfulness of all God's creatures (Gen. 1:22).

The fact that many people use and attempt to justify abortion in terms of controlling human population does not thereby excuse Christians from acting on their God-given responsibility for stewardship of their own lives and bodies, for care for other creatures, and to address issues of human population.

(8) I don't want to be an extremist or alarmist. *I want to be considered normal — not some kind of prophet of gloom and doom.*

Gloom and doom are not necessary components of the message that needs to be brought to people about caring for creation. Trying to frighten ourselves into action is far less preferable than working to care for creation out of a love for the Creator in gratitude and joy. But, because of the sinfulness of

human beings and the rationalization that people may bring to creation's destruction, it may also be necessary to bring the message of gloom and doom of Revelation 11:18, "The time has come...for destroying those who destroy the earth." There is no doubt about it: for those who might aspire to everlasting life (John 3:16), the prospect of destruction as portrayed in Revelation 11:18 because of complicity and participation in the destruction of the earth is gloomy. While the message of joy and peace, of God's creative, redemptive and reconciling power, should be sufficient to bring people to imitate God's love for the world, it often is not, and the proclamation of Revelation 11:18 might become necessary. Calling such people, or others who simply describe the degradations of creation, "prophets of doom" is no excuse for inaction. A truthful description of the status of creation will uncover immediately the sinfulness that undermines creation, and should lead all who profess God as Creator to overcome sin (Rom. 12:1-3; Gal. 1:24; Eph. 6:10-15; I John 3:7-10), and to live lives of gratitude and stewardship before God (Rom. 12:1-2; Matt. 5:16). Our working in and for creation, however, ideally, should not be out of a sense of impending doom, but from a deep love and obedience to Earth's Creator, Redeemer, and Reconciler (Gen. 1-2; John 1:1-3; Col. 1:15-20).

We do not, for example, find it "alarmist" if someone sounds the alarm when the building is burning, the burglar is in the store, the flood is coming, or the earthquake is upon us. In many cases it is necessary to sound the alarm.

Although we may be concerned about being called alarmists, we must recognize that God may act to get our attention through creation itself, or through people's speaking and writing. And, while we may dislike the word "alarmist," there certainly are times for "sounding the alarm." We do not, for example, find it "alarmist" if someone sounds the alarm when the building is burning, the burglar is in the store, the flood is coming, or the earthquake is upon us. In many cases it is necessary to sound the alarm. Ezekiel 33 not only points out this necessity, but also tells of the dire consequences for those who should sound the alarm but do not. Again, our path

should be one of truthfulness and obedience to God rather one governed by avoiding the unpopular names people might apply to us.

(9) Dominion means what it says — oppressive domination. *I think the Bible says that we have the right to destroy things that get in our way; that's what dominion is all about.*

Many, particularly critics of Christianity, have pointed to Genesis 1:28 to illustrate that the Bible is the root cause of environmental problems. That this verse has been so used in isolation from the rest of the scriptures cannot be denied. But dominion as outright oppression is neither advocated nor condoned by the scriptures. First, the Genesis 1:28 passage gives the blessing and mandate to people *before the Fall*. Second, this passage must be understood not in isolation, but in the context of the rest of the Bible.⁸ If this is done, we must come to the conclusion that dominion means responsible stewardship, to which a number of biblical principles attest. (See box beginning on page 88.) The model for dominion for Christians is Jesus Christ, who was given all dominion and, “who, being in very nature God...made himself nothing, taking the very nature of a servant.” Jesus took his servant status so far that “...he humbled himself and became obedient to death — even death on a cross!” (Phil. 2:6-8).

Dominion as outright oppression is neither advocated nor condoned by the scriptures.

(10) Other creatures and the environment must not be put ahead of people because people are more important. *I'm for people, and that means that people are more important than saving species of plants and animals — if anything is endangered it is people, not furbished louseworts or snail darters.*

This is an often-heard rationalization for not saving living species threatened with extinction. Our first question here should be “what does the Bible teach?” We have, of course, an actual instance we can consult in the account of the flood in Genesis 6-9. In our study of this passage, we need to ask: Who perishes? Who is saved? Are species less important than individual people? Is the environment less important than the people it supports? In other passages of scripture we find that God respects “the environment” so much that God calls heaven and earth as witnesses against people (Deut. 30:19) — witnesses to God’s setting before people the choice

between life and death, witnesses to God’s admonishment that they *choose life*. Clearly, people are important to God, but so are the other creatures, and having the unique responsibility in creation for demonstrating God’s love to the rest of creation, people must care for and keep creation.

People are important. We can even say that people are more important than other creatures — because they uniquely have both the character and the responsibility to show God’s love, toward each other and (like Noah) toward the other creatures of God’s creation. Thus, human beings, being made to reflect and emulate God, have the God-given ability and duty to care for and keep the creatures God has made.⁹ But this importance fades, as in Noah’s day, when people fail to use their special status in God-serving ways or work contrary to God’s will for creation. The result in Noah’s time was that the faithless people who spurned their God-given status were destroyed, while faithful Noah and the animal lineages were saved. Noah believed in God’s having created the world and its creatures, believed in God’s ability to save the threatened creation, acted on what he believed and, with his family and the animal lineages, was saved by obediently responding to God. The people who failed to recognize and act upon their God-given importance and responsibility were annihilated. Saving animal lineages was more important to God than saving those who were destroying what God ordained.

Noah believed in God’s having created the world and its creatures, believed in God’s ability to save the threatened creation, acted on what he believed and, with his family and the animal lineages, was saved by obediently responding to God.

What we learn from Noah’s obedient life is that our task — as God’s important image-bearing creatures — is to act on what makes us important. We are to live in obedience to God; we like Noah must mirror God’s love for the world. Our importance does not give us priority over other creatures so much as it gives us responsibility for them. This means that we must be publishing — in our lives, in our work, and in the landscape under our care — our steadfast and reflective faithfulness to the Creator, Redeemer, and Reconciler of all things (cf. Gen.

6-9 and Col. 1:15-20).¹⁰ We must be going about the care and keeping of the creatures as Noah did and as God does (Psalm 104).

A Pitfall to Creation's Care and Keeping

Beyond these stumbling blocks, there are the pitfalls which might prevent us from becoming stewards of our Lord's creation. I here identify one of these that is particularly effective in catching us along our way. It is one that may seriously trap or delay us, making us believe we are doing the real thing while it buries and destroys our own life blood and our ability to be stewards of our Lord's earth.

Across Christendom there is a widely held belief in two major revelations through which we come to know God — special revelation and natural revelation. Special revelation is the Holy Scripture, comprised of the Old and New Testaments; natural revelation is the revelation of God in the creation — a revelation based upon the belief that God as creation's Author is revealed in creation, including God's power, eternal nature, beauty, justice, integrity and wholeness. And while there always have been some "one-book" Christians who have seen the Bible — special revelation — as the only revelation of God, they usually do not remain "one-book" Christians for long because the Bible itself affirms general revelation by pointing out creation's testimony to God's divinity, everlasting power, glory, kindness, and providing care (Romans 1:20; Psalm 19:1; Psalm 104; Acts 14:17). Thus, most Christians affirm "two books" through which we come to know God: the book of the created world and the book of the written Word.

But some who have passed through the Christian tradition have become so impressed with our knowledge of how the world works as revealed through the tools of the natural sciences that they have come to believe that the natural world is the only revelation that has ultimate meaning. Thus, there are some "one-book" people for whom the natural world is the only book. Some who believe this way consider themselves "post-Christian," thereby acknowledging their roots and their "journey" through Christianity. Beyond that, some "one-book" believers see the Bible as a major stumbling block to living rightly on Earth today, and insist that "the Bible should be put on the shelf for twenty years" or that the Bible should be dismissed today as totally irrelevant.

If this were the end of the matter, it might be of little concern. But many of those who confess such

"earth-centered spirituality" believe that the church should be enlightened and transformed to their way of thinking as well. The authors of the book, *The Reign of Reality* — a book that replaces the word "God" with the word "Reality" and transforms the "Kingdom of God" into the "Reign of Reality" — have in mind the transformation of Christianity to a new form that moves beyond the authority of the Bible and the reality of God as personal. Seeing Christian belief in a personal God, and other beliefs, as too literal, they write,

The current worship and symbolic life of Christian churches is characterized by poetry that the ordinary participant cannot easily avoid taking literally...The task of radically deliteralizing the Christian understanding is being avoided in almost every congregation. It is not being carried out because a deliteralized Christianity is not economically supportable by literalistic Christians. Maintaining the economic viability of existing institutions is being valued over proclaiming a clear understanding of Christian faith."¹¹

"One-book" believers who advocate creation-centered spirituality, true to their earth-centered approach, often describe God as something that emerges from the world, as the world develops consciousness of itself; God to many of them is an emergent property of the unfolding of the universe. And Christ has been transformed into the "Christ Spirit" that is somehow the expression of Earth's spiritual nature, differing here and there across the face of the globe — differing in various places, times, and cultures.

*The pitfall here is not so much
that there is a developing
belief around
"earth-centered spirituality."
The pitfall nature of this
philosophy is that it is being
injected into the churches.*

The pitfall here is not so much that there is a developing belief around "earth-centered spirituality." The pitfall nature of this philosophy is that it is being injected into the churches. Adherents to this philosophy believe that it is needed in the churches. They see it necessary to wean Christianity away from its trust in the Bible and the personal God of Abraham, Isaac, and Jacob; to wean it from trusting in

Jesus Christ as Lord; to bring it to the maturity that comes through the new light shed by the revelation of the Earth itself. And with this transformation comes the deliteralization or shelving of the Bible, equation of God with the earth, and the degeneration of Jesus Christ to an earth spirit. Thus, unlike pitfalls that might be encountered as one moves between church and work place, this pitfall is being injected into the church itself.

***But a serious problem remains:
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do not know.***

Through my personal experience with some of the people who hold to this perspective — who thus depreciate the Bible, depersonalize God, and transform Jesus Christ into an all-pervasive earth-spirit — I have discovered some remarkably easy means for avoiding this pitfall in our lives and in our churches. These are to continue to pray to God our Father in the name of Jesus Christ; to continue to read and believe God's written Word; and to continue to be willing to be led by the Holy Spirit in our daily walk. Those who become fully committed to creation as its own principal revelation cannot engage in doing these things since they violate their post-Christian religion. Thus, if such post-Christian belief gains a foothold in a church, organization, or household, prayer to God in the name of Jesus Christ will diminish and increasingly feel awkward; the Bible will be cited less and read with less depth and interest; and the leading of the Holy Spirit will be spurned or denied. These are some of the signals that things are moving from Christian to post-Christian — from two-book revelation to one-book revelation.

Those who advocate creation-spirituality, such as Matthew Fox and Thomas Berry, are doing the best they can to explain the world without a personal God and savior; without the need for the leading of the Holy Spirit. They have passed through Christianity to evolve into something they consider better — something they believe is in better accord with the ways things are. While we must respect these people for their attempt to make sense out of God's world and our living in it, we must also recognize

that they have moved beyond the boundaries defined by the Scriptures.

Why is such creation spirituality a pitfall along the route of proper care for God's creation? Because it impoverishes the ability of the Scriptures to inform us; it disconnects people from personal access through prayer to God through the mediation of Jesus Christ, who hears and responds to our concerns, and petitions; and it blocks our being open to the person of the Holy Spirit who can guide us. Such impoverishment is ultimately devastating to ourselves and to creation.

Then What Must We Do?

Having considered the stumbling blocks and a pitfall that prevent many Christians from taking action — we are prepared to ask, "then what must we do?"

The simple, yet profound, response to this question appears to be this: "Love God as redeemer *and* creator, acknowledge God's love for the world, be open to the leading of the Holy Spirit, and act upon this by following Jesus who creates, upholds, and reconciles all things" (Col. 1:15-20; John 1:1-5).

But a serious problem remains: most people today have been alienated from the Creator and God's creation, and thus it is difficult to love, uphold, and make right again a world that we really do not know. Therefore, many will first have to become aware of creation and its God-declared goodness. Once we have gained awareness, we then can move to appreciation, and from appreciation on to stewardship.

Here is a helpful framework:

- (1) *Awareness* (seeing, identifying, naming, locating),
- (2) *Appreciation* (tolerating, respecting, valuing, esteeming, cherishing), and
- (3) *Stewardship* (using, restoring, serving, keeping, entrusting).

Awareness. Awareness stands at the very beginning as the first of three components of creation stewardship. Awareness means bringing things to our attention. When so much else calls for our attention — foreign affairs, local politics, jobs, traffic, accreditation, grades — the creation in its natural aspects may not even seem real to us. We might find that it seems real only on some of our travels,

and even then it may be seriously obscured by motel rooms, conference halls, ubiquitous television, and campground smog. We must consciously make ourselves aware of what is happening in God's creation.

Awareness involves seeing, naming, identifying, locating. It means taking off the blinders provided us by ourselves and society so that we not only see God's creation, but want to name and know the names of the things we see. It means providing ourselves with enough peace and thoughtfulness that we have the time and the will to identify a tree or a mountain, a bird or a river. It means having the sense to enter the natural world intentionally in order to locate and find God's creatures about which we sing in the doxology, "Praise God, all creatures here below."¹²

Awareness
means providing ourselves with enough peace and thoughtfulness that we have the time and the will to identify a tree or a mountain, a bird or a river. It means having the sense to enter the natural world intentionally in order to locate and find God's creatures about which we sing in the doxology, "Praise God, all creatures here below."

Appreciation. Awareness is not an end in itself. From awareness comes appreciation; we cannot appreciate that of which we are unaware. At the very least, appreciation means tolerating. We may tolerate, for example, worms and hyenas and so doing appreciate them. But beyond toleration, appreciation can also mean respect. We certainly respect a large bear, but we can also develop respect for a lowly worm as we learn of its critical importance in creation. And, appreciation can build from tolerating to respecting, and on to valuing. We know that God declares creation to be good, and we will find that God does so for good reason! As we become aware of the order of creation, we will find ourselves reflecting God's valuing of the creatures. And this will build even further until much of what we discover we will even esteem and cherish. Thus, awareness will lead to appreciation.

Stewardship. Appreciation does not end the matter either, for appreciation leads to its ultimate conclusion: stewardship. At first, stewardship may mean appropriate use of creation; perhaps our appreciation for a flower will lead us to put it into a vase to decorate our table. But stewardship will bring us well beyond appropriate use to keeping what remains, and then to restoring what has been abused in the past. The widespread lack of awareness and ignorance of creation and creation's integrity means that we and many others have abused and degraded the environment unknowingly, and stewardship means that we will work to set things right again — to reconcile and redeem. We might even buy back something degraded to make it right again.

At first, stewardship may mean appropriate use of creation; perhaps our appreciation for a flower will lead us to put it into a vase to decorate our table. Stewardship will bring us well beyond appropriate use to keeping what remains, and then to restoring what has been abused in the past.

Beyond restoration, stewardship means serving. As we understand that God through creation is in so many ways serving our own lives, we will return this service with our own. Our service will include a loving and caring keeping of what we hold in trust, providing the creatures their time of sabbath rests, and preserving creation's fruitfulness (see box beginning on page 88). Ultimately our service in creation will even involve entrusting others with what we have served, kept, and restored.

Christian environmental stewardship — our loving care and keeping of creation that mirror's God's love — is a central, joyful, part of the human task. As communities of God's stewards — as the Body of the One who made, sustains, and reconciles the world — our churches and our lives can and must be convicting publications and vibrant testimonies that glorify and honor our Redeemer and Creator.

"Thou art worthy, O Lord, to receive glory and honor, and power: for thou hast created all things, and for thy will's sake they are, and have been created." (Rev. 4:11, Geneva Bible) ☸

Biblical Principles for Environmental Stewardship

1. *Earthkeeping Principle: As the Lord keeps and sustains us, so must we keep and sustain our Lord's creation.*

Genesis 2:15 shows God's expectation that Adam and Adam's descendants will *serve* and *keep* the garden. The Hebrew word upon which the translation of *keep* is based is the word "shamar" and "shamar," means a loving, caring, sustaining keeping. This word also is used in the Aaronic blessing from Numbers 6:24, "The Lord bless you and *keep* you." When we invoke God's blessing to keep *us*, it is not merely that God would keep us in a kind of preserved, inactive, uninteresting state. Instead, it is that God would keep us in all of our vitality, with all our energy and beauty. The keeping we expect of God when we invoke the Aaronic blessing is one that nurtures all of our life-sustaining and life-fulfilling relationships — with our family, spouse, and children, with our neighbors and our friends, with the land and creatures that sustain us, with the air and water, and with our God. And so too with our keeping of the Garden — in our keeping of God's creation. When Adam, Eve, and we, *keep* the creation, we make sure that the creatures under our care and keeping are maintained with all their proper connections — connections with members of the same species, with the many other species with which they interact, with the soil, air and water upon which they depend. The rich and full keeping that we invoke with the Aaronic blessing is the kind of rich and full keeping that we should bring to the garden of God — to God's creatures and to all of creation. As God keeps his believing people, so should God's people keep creation.

2. *Sabbath Principle: We must provide for creation's Sabbath rests.*

Exodus 20 and Deuteronomy 5 require that one day in seven be set aside as a day of rest for people and for animals. As human beings and animals are to be given their times of sabbath rest, so also is the land. Exodus 23 commands, "For six years you shall sow your land and gather in its yield; but the seventh year you shall let

it rest and lie fallow, that the poor of your people may eat; and what they leave the wild beasts may eat." "You may ask, 'What will we eat in the seventh year if we do not plant or harvest our crops?'" God's answer in Leviticus 25 and 26 is: "I will send you such a blessing in the sixth year that the land will yield enough for three years," so do not worry, but practice this law so that your land will be *fruitful*. "If you follow my decrees and are careful to obey my commands, I will send you rain in its season, and the ground will yield its crops and the trees of the field their fruit."

Christ in the New Testament clearly teaches that the Sabbath is made for the ones served by it — not the other way around. Thus, the sabbath year is given to protect the land from relentless exploitation, to help the land rejuvenate, to help it get things together again; it is a time of rest and restoration. This sabbath is not merely a legalistic requirement; rather, it is a profound principle. Thus, in some Christian farming communities, the sabbath principle is practiced by letting the land rest every *second* year, "because that is what the land needs." And of course, it is not therefore restricted to agriculture but applies to all creation. The Bible warns in Leviticus 26, "...if you will not listen to me and carry out all these commands, and if you reject my decrees and abhor my laws and fail to carry out all my commands and so violate my covenant...Your land will be laid waste, and your cities will lie in ruins...Then the land will enjoy its sabbath years all the time it lies desolate...then the land will rest and enjoy its sabbaths. All the time that it lies desolate, the land will have the rest it did not have during the sabbaths you lived in it."

3. *Fruitfulness Principle: We should enjoy, but must not destroy, creation's fruitfulness.*

The fish of the sea and the birds of the air, as well as people, are given God's blessing of fruitfulness. In Genesis 1:20 and 22 God declares, "Let the water teem with living creatures, and let birds fly above the earth across the expanse

of the sky." And then God blesses these creatures with fruitfulness: "Be fruitful and increase in number and fill the water in the seas, and let the birds increase on the earth." God's creation reflects God's fruitful work — God's fruitful work of giving to land and life what satisfies. As it is written in Psalm 104, "He makes springs pour water into the ravines; it flows between the mountains. They 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 its branches. He waters the mountains from his upper chambers; the earth is satisfied by the fruit of his work." And Psalm 23 describes how our providing God "...makes me lie down in green pastures, ...leads me beside quiet waters, ...restores my soul."

As God's fruitful work brings fruit to creation, so too should ours. As God provides for the creatures, so should we people who were created to reflect God whose image we bear. Reflecting God, we too should provide for the creatures. And, as Noah spared no time, expense, or reputation when God's creatures were threatened with extinction, neither should we. Deluges — in Noah's time of water, and in our time of floods of people — sprawl over the land, displacing God's creatures, limiting *their* potential to obey God's command, "be fruitful and increase in number." To those who would allow a human flood across the land at the expense of all other creatures, the prophet Isaiah warns: "Woe to you who add house to house and join field to field till no space is left and you live alone in the land" (Isa 5:8).

Thus, while we are expected to enjoy creation, and expected to partake of creation's fruit, we may not destroy the *fruitfulness* upon which creation's fullness depends. We must, with Noah, save the species whose interactions with each other, and with land and water, form the fabric of the biosphere. We should let the profound admonition of Ezekiel 34:18 reverberate and echo in our minds:

*"Is it not enough for you to feed on the green pastures?
Must you also trample them with your feet?"*

*"Is it not enough for you to drink the pure water?
Must you also muddy it with your feet?"*



Notes

¹For a description of environmental degradations in biblical context, see C. B. DeWitt, "Seven Degradations of Creation," in C. B. DeWitt, ed., *The Environment and the Christian: What Does The New Testament Have to Teach* (Grand Rapids, MI: Baker Book House, 1991), pp. 13-23.

²Not only does the Bible have a corner on the Kingdom of God, but it is the Kingdom of God and its rightness — its righteousness — that must be the highest priority, according to Matt. 6:33. For a theological treatment in the context of environmental stewardship, see Gordon Zerbe, "The Kingdom of God and Stewardship of Creation," in C. B. DeWitt, ed., *The Environment and the Christian: What Can We Learn from the New Testament?*, pp. 73-92.

³Described in Acts 17:22-31.

⁴Also see Isaiah 44:28.

⁵See Daniel 1:8 and 6:10, upon which this song is based.

⁶"Man does not live on bread alone but on every word that comes from the mouth of the Lord..." so it is written (Deut. 8:3, Matt. 4:4), and so we sing.

⁷The International Crane Foundation is an excellent model of Earthkeeping, particularly at the international level. It is located at E-11376 Shady Lane Road, Baraboo, WI 53913, where it maintains breeding pairs of all crane species for reintroduction into native habitats.

⁸See, for example, Genesis 2:15, where Adam is commanded by God to *serve* the garden and to *keep* it. The Hebrew word *'abad* often translated "till" in this passage usually is translated "serve" elsewhere (such as in Joshua 24:15 — "...as for me and my house, we will *serve* Jehovah."); the Hebrew word *shamar* means a loving, sustaining, caring keeping as it also does in Numbers 6:24, "The Lord bless you and *keep* you..."

⁹The word "keep" here has a deep meaning that goes beyond mere preservation of individuals, to include the fullness of sustaining and dynamic social and ecological interrelationships. See the box beginning on page 88 for a discussion of this based upon Gen. 2:15.

¹⁰The words, "all things," in Col. 1:20 are given in the Greek as *"ta panta,"* meaning "everything" in the broadest scope. In Loren Wilkenson's "Christ as Creator and Redeemer" (p. 28, in DeWitt, C. B., ed., *The Environment and the Christian: What Can We Learn from the New Testament?*), Wilkinson points out that Colossians 1:15-20 states that

in Christ, "all things" (Gk. *panta*) hold together because "in him they were created." But this passage goes much further...Christ...is to be the one in whom all things are reconciled and brought into harmony. Paul is explicit in that it is not just human beings that are thus brought into harmony, but "all things."

¹¹Marshall, Joyce and Gene Marshall, *The Reign of Reality: A Fresh Start for the Earth*, Dallas: Realistic Living Press, 1987, p. 157.

¹²The Evangelical Lutheran Church in America (ELCA) is a leader in promoting the concept of "Making Your Church A Creation Awareness Center." Documentation on this program can be obtained from the Environmental Stewardship Office, ELCA, 8765 Higgins Road, Chicago, IL 60631, or Au Sable Institute Outreach Office, 731 State Street, Madison, WI 53703, (608) 255-0950.



Do Biblical Models Need to Be Replaced In Order to Deal Effectively with Environmental Issues?

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Attempts to develop models to guide a Christian response to environmental issues have in recent years frequently involved an emphasis that deviates from that derived from the Bible. The general argument is that the traditional biblical view of the human/environment interaction is too human-centered, too concentrated on human authority over nature, and too deficient in the crucial nature of the interactions that occur between human beings and the rest of the created world in which they live. Searching for new stimuli for dedicated and responsible action, some have been led into the search for a new world view that will, in their opinion, be capable of sustaining their goals. Typical of these efforts is the advocacy of a resacralization of nature, a recognition of the presence of the divine in everything in the created world, an appreciation of the spiritual qualities of all nature revealed to us by modern science, a removal of all theoretical distinctions between human beings and the physical universe, and the Gaia hypothesis — where Gaia is the name for the earth viewed as a living organism. In this paper we consider the question: "Is responsible environmentalism better expressed within the biblical models of creation, stewardship and redemption, or within the proposed models of religious monism and resacralization of nature?"

For millennia human beings have lived oblivious of the effects of their lifestyle on the earth, secure in the conviction that the earth is far larger than necessary to absorb their pollution, waste and growing population. If present locations became uninhabitable, it was always possible to move on beyond the frontier. Today we have come to realize that the limits of the whole earth's capabilities are under stress, and although with the exercise of a high level of creativity, intelligence, and compassion we could certainly improve the present situation immeasurably, still there is a finite limit beyond which we cannot go in the future. Earth's resources are being stretched to the vanishing point, human attempts to provide a better life are threatening to pollute land, air, and water to such an extent that the quality

of life will be drastically lowered, and human waste alone seems on the verge of burying us.¹ If we do exceed the limit of earth's capabilities, the human population of the earth will, to be sure, not continue to increase in its present practices; it will be limited by suffering and death through shortening life span, disease, and war. In addition to its obvious military applications, the space program has been motivated by the realization that earth is getting too small and that we must begin to look for living space beyond this planet if we do not plan to drastically change our ways of living.

A variety of contributing factors can be cited for this present critical situation. We can cite the universal dominance of materialism, which can be de-

defined as the position that "to have is to be." We can cite the failures of our dominant social economic models: free enterprise (competition) and socialism (cooperation); both of these models, used exclusively, when pursued by limited and sinful human beings, lead to something quite different and unsatisfactory. We can cite the false barriers between people raised by their preoccupation with nationalism, racism and ethnicism.²

A useful alternate cross-section of these contributing factors has been given by Frair.³ He pinpoints the importance of ignorance, inertia, and irresponsibility. Because of ignorance, we have proceeded to do what seemed to be good at the time, but without recognizing the inevitable damage to the environment that would result. Because of inertia, we have continued social practices that might have been tolerable in an earlier day in a frontier-mentality, but are no longer acceptable in the shrunken world of today. Because of irresponsibility, we have often put short-term profits ahead of long-term responsibility for care of the environment, and have based our lifestyle on greater expansion, larger markets, and bigger profits.

A Biblical Model for Environmentalism

The attempt to construct a biblical model for environmentalism has the following inputs.

Creation. The biblical teaching about the creation of the universe by God establishes that the earth belongs to God, and that it is a gift given in trust to us by God. The universe is separate from God (expressing the transcendence of God), but it is totally dependent upon God (expressing the imminence of God). He appoints men and women as his stewards (caretakers) over it, to preserve it and maintain its health for God and for the benefit of all creation. The key passage is Genesis 1:26-28.

Then God said, "Let us make man in our image, after our likeness; and let them have dominion over

the fish of the sea, and over the birds of the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth."
...And God blessed them, and God said to them, "Be fruitful and multiply, and fill the earth and subdue it; and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth."

Care must be exercised, of course, to interpret words such as "dominion" and "subdue" within the biblical context, so that this basic injunction to stewardship is not obscured by misunderstanding and misapplication. These words do not mean "exploit" or "bring into subjection," as if the world belonged to us and we were the ultimate lords of creation.

The law of Leviticus and Deuteronomy reveals God's concern for the land. The concept of ownership is revised — we do not own it in some absolute sense, but we take care of it (or abuse it) for God. "The land shall not be sold in perpetuity, for the land is mine ..." (Lev. 25:23) The moral faithfulness of God's people is linked with the condition of the earth in Hosea 4:2, 3:

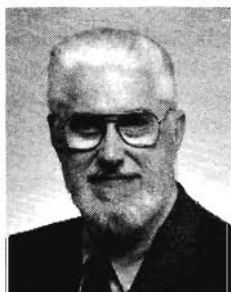
.. there is swearing, lying, killing, stealing, and committing adultery; they break all bounds and murder follows murder. Therefore the land mourns, and all who dwell in it languish, and also the beasts of the field, and the birds of the air; and even the fish of the sea are taken away.

and Isaiah 24:5, 6:

The earth lies polluted under its inhabitants; for they have transgressed the laws, violated the statutes, broken the everlasting covenant. Therefore a curse devours the earth, and its inhabitants suffer for their guilt ..."

The created order will share in the redemption won by Christ, as described in Romans 8:19-22.

For the creation waits with eager longing for the revealing of the sons of God; ... because the creation itself will be set free from its bondage to decay and



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obtain the glorious liberty of the children of God. We know that the whole creation has been groaning in travail together until now...

The concept of stewardship follows directly from the biblical teaching that all creation belongs to God, not to us.

Stewardship. The term "stewardship" expresses our responsibility for the care of all things in the created universe that God has given into our trust: other creatures, all living things, land, water, air, energy, and material resources. Faithful and unfaithful stewards are prominent in the parables of Jesus in Matthew 20 and Luke 12. Paul likewise indicates that stewards are required to be trustworthy in I Cor. 4:2, Titus 1:7; see also I Peter 4:10. The concept of stewardship follows directly from the biblical teaching that all creation belongs to God, not to us.

Stewards are required to be faithful where they are, doing what they can to be faithful to their calling. Such faithful stewardship is a personal commitment. We are called to live in this way not only because it is effective, not only because it works, but primarily because we desire to serve our Lord.

Criticisms of the Biblical Model

When we look at the problems in the world around us, we find that the noble sentiments of the biblical model do not seem to have been too effective in achieving environmental preservation and health. Historically, it has been conventional to respond to this discrepancy by pointing out that "It is not that Christianity has been tried and found wanting; rather Christianity has been found difficult and not tried."

In more recent years, however, there has been an increasing chorus of those who conclude that Christianity is not just the untried solution to our problems, but rather that at a fundamental level the Judeo-Christian world view is responsible for our failures. In a much-noted paper, Lynn White⁴ made the claim that the historical roots of the ecological crisis are to be found in the Judeo-Christian tradition of human beings as the rulers of the earth. By exalting human beings at the expense of nature, White argues that Christianity has separated human beings from nature, has argued against the oneness of human beings and nature, and has given divine approval

to the unlimited exploitation of nature by human beings.

There is probably no doubt historically that human beings and institutions who have thought of themselves as Christian have been guilty of these various aberrations. A key question, however, is "Are these shortcomings a consequence of a proper understanding and a faithful response to the Judeo-Christian position, or are they a human distortion of this position governed by ignorance, inertia and irresponsibility?" Critics of the biblical model might then respond that the failures of the biblical model result, not from its being incorrect, but from its being ineffective. It simply is not vital enough to command the allegiance of those who presumably should subscribe to it; we need a new, more robust and commanding model that would attract people into changing their actions.

Critics of the biblical model might then respond that the failures of the biblical model result, not from its being incorrect, but from its being ineffective. It simply is not vital enough to command the allegiance of those who presumably should subscribe to it...

A similar charge is leveled against the traditional biblical model for environmental stewardship by Gray,⁵

"I want to challenge the assumption that we have in our Jewish and Christian traditions an adequate creation theology. By creation theology I mean an adequate mental picture and conceptual grasp of ourselves, our world, and our relationship to the Creator."

In rebellion against Psalm 8:3-8, with its statement that God has made humans a little lower than the angels, made them to have dominion, and put all things under their feet, Gray responds,

What we're given here is a nifty little snapshot in which God is above, highest in value. Angels are next and just slightly higher than humans. Then come humans. And everything else is underneath our feet.

Gray presents two major criticisms of the biblical model as she perceives it. (1) Reality is not hierarchical but interrelated. (2) Human beings are not "above" nature in dominion or control. Dominion must be replaced by "attunement" or "fitting in."

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Both of these criticisms might have some validity against extreme distortions of the biblical model. But examination of the *structure* of the world indicates that the fundamental structure is hierarchical, consisting of parts and wholes, with the result that a hierarchical description emphasizes the degree of interrelatedness.⁶ The properties of the wholes emerge from a particular patterned interaction of the parts, but the behavior of the parts is affected by the condition and feedback of the whole.

And the description of humans being "above" nature cannot be simplistically dismissed without realizing that there are relationships in which human beings are indeed "above" nature (only human beings have the ability for a personal fellowship with God) while at the same time there are other relationships in which human beings are an interacting, interrelated part of nature (human beings are fellow creatures related to all the rest of creation). It is not a question of choosing between a model in which humans are "above" nature and its mutually exclusive opposite in which humans are identical with the rest of nature. In one more example of our need for complementary descriptions, human beings are both "above" nature in some respects, *and* identifiable with nature in others.

A Proposed New Age Model

If the traditional biblical model for environmental stewardship is judged to be outdated, misleading, and hopelessly enmeshed in misleading symbolism, then the way is open for the formulation of a new model that will avoid these problems.

(1) If the desacralization of the world as a result of the Judeo-Christian world view, which declares that the earth is a "thing" created by God and that world views in which animism plays a prominent role are thereby ruled out, is responsible for our bad treatment of the "things" of the earth, then the solution is to be found in resacralizing them.⁷ Once we can claim that everything on earth is really part of God, or at least is invested with a personal divine spirit, then we will have a new motivation for treating these "things" of the earth with respect. The American Indians are right in their religious beliefs, and Christians are wrong.

For the Lakotas and Cheyennes all creation is sacred, all creation is filled with supernatural life. ... Sacred Powers assume forms that human beings can recognize. Thus the Sacred Powers may appear as animals, birds, or natural forces. ... This is a sacred world, a world filled with supernatural life and power. The Earth, the Mother of the People, is a supernatural person.⁸

If the desacralization of the world as a result of the Judeo-Christian world view, which declares that the earth is a "thing" created by God ... is responsible for our bad treatment of the "things" of the earth, then the solution is to be found in resacralizing them.

The theme of resacralization is sounded again by Rifkin,⁹

To end our long, self-imposed exile; to rejoin the community of life. This is the task before us. It will require that we renounce our drive for sovereignty over everything that lives; that we restore the rest of creation to a place of dignity and respect. The resacralization of nature stands before us as the great mission of the coming age.

Now in many such descriptions as these (and others to follow) the reader is left uncertain. Is the author using a dramatic poetic style of hyperbole to make a point, or does the author mean this as a literal statement? If we were assured of the former, then we might be willing to give a certain freedom in expression, which would not be possible if we were assured of the latter.

(2) If our environmental problems arise from the fact that we do not perceive the intimate relation-

ships between ourselves and the natural world around us, then the solution is to be found in formally terminating all distinctions between our selves and the natural world.

.. if the self is expanded to include the natural world, behavior leading to destruction of the world will be experienced as self-destruction.¹⁰

... the illusion of separateness we create in order to utter the words "I am" is part of our problem in the modern world. We have always been far more a part of great patterns on the globe than our fearful egos can tolerate knowing ... To preserve nature is to preserve the matrix through which we can experience our souls and the soul of the planet Earth.¹¹

If our insensitivity to environmental concerns is the result of our viewing the earth as simply being "stuff" that's there for us to live on, then the solution is to invest the earth itself with life and spirit, viewing it as a living organism.

(3) If our insensitivity to environmental concerns is the result of our viewing the earth as simply being "stuff" that's there for us to live on, then the solution is to invest the earth itself with life and spirit, viewing it as a living organism. Such an organism must be named, and so the name of the Greek goddess for the earth, Gaia, is invoked. The result has been described as follows,

Is it science or is it religion? Not even the promoters of Gaia agree completely. Gaia is the New Age darling of spiritual feminists, neo-pagans, political environmentalists, and animal-rights activists. Yet in the past three years, more than 100 *scientific* and *technical* articles have been written on Gaia theory. Gaia, the Greek earth goddess, has scientists hotly debating the reality of her existence. The Gaia hypothesis is the scientific expression of the pre-Christian belief that the Earth is a living creature.¹²

The so-called Gaia Hypothesis was advanced by Lovelock¹³ who proposed that "the Earth may be a living organism," that the name Mary, of the Virgin Mary, may be simply another name for Gaia, and that "'Gaia' is a religious as well as a scientific concept." He concludes, "I have tried to show that God and Gaia, theology and science, even physics and

biology are not separate but a single way of thought." Similarly Berry,¹⁴ described as "an ecotheologian — that is, a theologian who self-consciously shapes the principles of the Christian religion in response to the natural world and our responsibilities toward it," writes,

One of the finest moments in our new sensitivity to the natural world is our discovery of the earth as a living organism.... Personal designation of the earth as Gaia is no longer unacceptable in serious discussion.

Scientific studies of the complex range of interactions that affect life on the earth have sometimes adopted the name of Gaia due to its timely implications.¹⁵ Certainly the significance of these investigations for the solution of environmental problems should not be underrated. But the poorly defined development of the Gaia-hypothesis "undermines biblical creation by imputing a kind of divine power to the Earth, while offering a science that resonates with ancient mysticism."¹⁶ Biologist Margulis is also concerned, and writes¹⁷

A far more accurate short statement of Gaia, discussed in chapter 12 of my recent book, is that the surface temperature, chemistry of the reactive gaseous components, the oxidation-reduction state and the acidity-alkalinity of the Earth's atmosphere and surface sediments are actively (homeorhetically) maintained by the metabolism, behavior, growth and reproduction of organisms (organized into communities) on its surface. Gaia is not an individual, it is an ecosystem.

If our lack of respect for our environment is the result of thinking of human beings alone as intelligent, spiritual and personal, then the solution is to consider all of matter as being basically intelligent, spiritual and personal — and invoke modern scientific developments such as quantum mechanics as the basis for such a claim.

(4) Finally, if our lack of respect for our environment is the result of thinking of human beings alone as intelligent, spiritual and personal, then the solution is to consider all of matter as being basically

intelligent, spiritual and personal — and invoke modern scientific developments such as quantum mechanics as the basis for such a claim.¹⁸ It is claimed that this "new cosmology" can legitimately be understood as the good news (i.e., the gospel) of salvation for our age." This "new cosmology" calls for us to see the divine in everything that lives, and focuses on the findings of modern science that supposedly enable us to save the material world by declaring it to really be spiritual.

A number of dramatic claims are made for this new scientific perspective into the nature of matter:

- Scientists have come to see that all matter has a mysterious, psychic/spiritual dimension.
- Physicists are beginning to tell us that every atom of the universe has an inner intelligence which is non-material and ultimately unknowable.
- The earth is alive and we are the Earth's reflexive consciousness.
- There is nothing in existence that does not have subjective experience.
- Every being, from individual atoms, to individual persons, to individual solar systems, to individual galaxies, has a non-material center, an inner intelligence.

and the new theological perspective that is consistent with this new scientific perspective:

- This cosmology can be understood as an integral part of what the church has traditionally anticipated as "the second coming of Christ."
- Ignorance, not evil, seems to be the root of the problem.
- The commandments of God are found through empirical observation of the universe.
- Nature is the primary Bible.
- We are neither stewards, nor caretakers, nor anything else that assumes we are separate from nature. We have no existence apart from the living Earth. We *are* the Earth.

The principal difficulty with these claims is a simple one: they are simply not true.

The principal difficulty with all of these claims is a simple one: they are simply not true. There is not a single shred of support for these statements in either authentic science or authentic Christian theology.¹⁹

These are views expressed in visionary poetic language to describe the new situation when science and religion join together in one environmentally supportive role. But they do not express valid and necessary conclusions derived from science, and even express conclusions that scientific results contradict. If they are taken as essentially poetic statements, then one can grant that certain aspects of their metaphorical usage reflect human feelings. But if they are taken as literal statements, they can only be rejected as pseudoscience and pseudotheology.

Modern science has shown us that the basic descriptions currently available for the very small and the very fast do not correspond to our common sense expectations from macroscopic experience. But there is absolutely no connection with a psychic/spiritual dimension. There appears to be here the usual problems associated with an attempt to assert that the reality of life, consciousness, and intelligence at the more complex levels of living creatures is the result of the existence of these qualities in the atomic matter of which we are composed.²⁰ It should be repeated: there is no scientific basis for such claims. It may well be that some individuals who work as scientists in part of their lives make public claims in support of such statements as those listed above; but this is then not a consequence of their science but of a world view that they have assumed on faith quite independently.

Discussion of Environmental Models

What is the intrinsic value of the natural world and how does it relate to human values? Summarizing the discussion of this paper, we may define three major models, each with fairly direct consequences if consistently followed.²¹

(1) The natural world has value only because of its usefulness to human beings. The earth belongs to human beings and they can do with it whatever contributes to their sense of well being. If some aspect of the natural world is considered "not useful" to human beings, it can be summarily dispensed with. This can be a fairly broad view, including not simply various forms of environmental exploitation, but even efforts to preserve the environment based only on the conviction that conservation is in the best selfish interest of human beings. This is a common secular world view, but not advocated by defenders of either a biblical or a New Age model. It is nevertheless the model often ascribed to the Judeo-Christian world view by New Age advocates.

(2) The natural world has exactly the same value as human beings, because human beings and the natural world are essentially one with each other and with God. Both human beings and the rest of the natural world exhibit the Spirit of God, and we are bound in one great complex mutual interaction in which no single species can claim any higher position than any other. This is the model proposed by New Age advocates to win the day for environmentalism.

Nature has intrinsic value as nature because of Creation; a tree has value as a tree because God made it as a tree.

The tree does not have value because it is really a form of God; it has value as a tree because God made it to be a tree.

(3) Nature has intrinsic value as nature because of Creation; a tree has value as a tree because God made it as a tree. The tree does not have value because it is really a form of God; it has value as a tree because God made it to be a tree. The value of nature to human beings is then a second source of value in addition to this intrinsic component. It is recognized that on the level of creation, human beings are part of the natural world and cannot ever forget this interdependence, but as the only creatures made in the image of God, human beings are also distinct from nature and responsible for its care before God. This is a crucial distinction with reference to the critique given by Gray above. Schaeffer²² has dramatically captured this relationship in his words,

But I must be clear that I am not loving the tree or whatever is standing in front of me, for a pragmatic reason. It will have a pragmatic *result*, the very pragmatic results that the men involved in ecology are looking forWhen we have learned this — the Christian view of nature — then there can be a real ecology; beauty will flow, psychological freedom will come, and the world will cease to be turned into a desert. Because it is right, on the basis of the whole Christian system — which is strong enough to stand it all, because it is true — as I stand and face the buttercup, I say, "Fellow creature, fellow creature, I won't walk on you. We are both creatures together."

The solution to the dilemma lies not in repudiating the biblical perspective of human beings as the re-

sponsible stewards of God's creation, but in reemphasizing it to a post-Christian culture that holds onto the forms but has forgotten the heart of the message. The biblical perspective emphasizes the unity between humans and earth by the creation account of man's formation from the dust of the earth (Gen. 2:7). Although human beings are the crown of creation, they are given the responsibility to care for the created order. De Witt emphasizes how commitment to biblical principles demands, therefore, both concern and appropriate action to preserve environmental integrity and to prevent pollution.²³

Wilkinson²⁴ points out several of the major theological issues. He says: (1) we need to think of creation in terms of an ongoing process in which God is and continues to be active in the world. "Creation is an unfolding process, not just a one-time act." (2) We need to rethink the traditional interpretation of "the curse" as the cause of all of the natural evil in today's world. But we need to be at least as aware of the fact that "our present woes are due rather to our sinful use of an relationship to the Earth than to any malfunction of the created order as such." (3) We need to rethink simplistic identification of population pressure, global warming, and species extinction as indicators of the end time when the Earth will be destroyed, and see again the significance of "the gospel as good news for all of creation, not just humans." (4) We need to rethink the place of human beings in creation. Perhaps the passage in Romans 8 is revealing that "it will be the human privilege to *complete* creation and be its voice of praise to the Creator." (5) We need to rethink our emphasis on Jesus Christ solely as Redeemer, and recognize the New Testament teaching that he is also our Creator and Sustainer.

The solution to the dilemma lies not in repudiating the biblical perspective of human beings as the responsible stewards of God's creation, but in reemphasizing it to a post-Christian culture that holds onto the forms but has forgotten the heart of the message.

Living out our biblical responsibilities as stewards of God's creation demands more, to be sure, than simply the right model or the right motivation. It

demands a thorough involvement in understanding the physics, chemistry and biology of environmental interactions so that we can be creative in our responsibility, combining concern with our environment with concern for the needs of human beings on earth. On the other hand, we are not ultimately aided either in arriving at creative responses in the real world, or in having the right attitude of heart that motivates us to act to preserve the environmental interactions sustaining life, by a proposed world view that is based upon pantheism, monism and animism.



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Announcing

The History of Science and Religion in the Western Tradition: An Encyclopedia

Work has begun on *The History of Science and Religion in the Western Tradition: An Encyclopedia*, to be edited by Gary B. Ferngren, Edward J. Larson, and Darrel W. Amundsen, and published by Garland Publishing Company, Inc., of New York. The work will be comprised of alphabetically arranged entries on all aspects of the subject, and is intended to provide an overview of current scholarship. It is scheduled to appear in 1996.

An editorial advisory board has been appointed, consisting of John H. Brooke of the University of Lancaster; Owen Gingerich of Harvard University; David C. Lindberg of the University of Wisconsin; and Ronald L. Numbers of the University of Wisconsin.

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Technological Pessimism

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This article will explore the critique made against technology by several technological pessimists. I argue that they are so designated because their overall assessment of the meaning and the place of technology within our lives is a negative one. That is, they view technology as destroying human freedom, corrupting our social process, and degrading our natural environment. Technology has even become a "demonic idol," according to one of the persons surveyed. The paper will focus primarily on representative work of Jacques Ellul, a Christian, with brief discussion of neo-Marxist Jürgen Habermas as well as the views of Nicholas Berdyaev.

This article surveys the thought of some representative technological pessimists and their overwhelmingly negative view of the place and the meaning of modern technique. It will focus especially on the thought of Jacques Ellul. His definition of technique is representative.

... technique is the *totality of methods rationally arrived at and having absolute efficiency* (for a given state of development) in *every* field of human activity. Its characteristics are new; the technique of the present has no common measure with that of the past.¹

The technological pessimists have argued that the meaning and imposition of modern technique is decidedly negative. Its products must be avoided if life in any sense is to be saved. I see no facile optimism, no calculations of the tradeoffs between the positives and the negatives of technique here, nor any attempt to locate technique within the context of life's many demands.² The technological pessimists will only see the dark side of technique.

I have chosen to examine three representative, interdisciplinary figures — Jacques Ellul (in the main), Jürgen Habermas, and Nicholas Berdyaev — for two basic reasons. First, they represent two important intellectual traditions, since Ellul and Berdyaev are Christians and Habermas is a neo-

Marxist. Second, their command of the breadth of knowledge qualifies them to address so crucial a topic as the place of technique in our lives. Certainly there are other representative figures, as the reader will see if he or she scans the notes. But in my opinion these three figures uniquely confront the modern reader with the problem of technique in disciplines as far ranging as theology and the philosophy of mathematics.

I also note that the two Christian authors employ theological categories in conjunction with their sociological and philosophical analyses of technique. A recognition of this fact is mandatory for our understanding. If we only discern, say, an author's views on technology, we miss much of his additional thought and therefore render our analysis superficial. This task of understanding the whole of one's thought is especially important for the "dialectical" thought of Jacques Ellul.

Jacques Ellul and Pessimism

One of the most recognized and widely respected technologists is French social theorist Jacques Ellul. This Protestant thinker has thrown down the gauntlet to the modern reader by arguing that technology has not produced a heaven on earth; it has spawned

a *gulag*. The technological prison that surrounds and defines us is totalitarian, autonomous, "demonic," and insidious in character. In fact, it is so all-encompassing that society can be called technological. That is, according to Ellul, society exists by, for, and unto technology.

We begin to discern the force, scope and methods Ellul believes modern technology employs when we see words in his definition like "totality," "rationally arrived at," "absolute efficiency," and "every field." Ellul is arguing that the technical process is orchestrated by autonomous rationality, a rationality that allegedly operates on its own laws. The end of this rationality is the efficient control of every area of life. The methods of technical experts — scientific, investigative, technical, productive — are the avenues used by autonomous reason. The social influence of these technical methods is both extensive and intensive. Technique deeply transforms the fabric of life. People, the natural world, the workings of science, views about our humanity and traditional religion, as well as art and politics all come under the tyranny of modern technique.

It would be a mistake to believe that Ellul equates technique with technical objects. While tools, weapons, cars, computers etc., are technologically made, these objects do not represent the heart or core meaning of technique for Ellul. Rather, technique is an autonomous social process. Technique produces a rational, step-by-step, procedural way of living. Technique can be practically seen in factories, bureaucracies, research and development teams, city planning, committees, and other means.

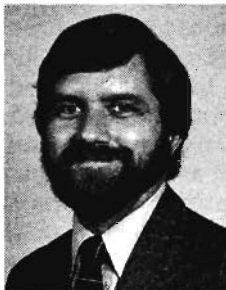
The "expert" most clearly and explicitly demonstrates this technical mentality. Experts are "specialists" who have "mastered" (or have controlled) a field because of their "competency" (or narrowed specialties) to evaluate and "solve" (by rational means) problems. Professional acceptance and self esteem come with the credentialing process that la-

bels one an "expert." These experts, in turn, impart methods or techniques to us for solving life's problems. We trust these experts to give us advice covering all crucial areas of life. However, Ellul contends that in trusting these experts for solutions we lose our freedom and integrity, which he believes are essential for life.

Technique's Attributes

According to Ellul, technique is above all "religious" — in two senses. He claims that technique is autonomous, a law unto itself. "Technique has become autonomous; it has fashioned an omnivorous world which obeys its own laws and which has renounced all traditions."³ Technique is also universal, its reign so complete that traditional religions and associated mores fall prey to its sovereignty. Ellul argues that the western technical and economic secularization that significantly remade the "Shah's Iran" is one of the best examples of technique's ability to overrule traditional Islamic society. Traditional customs and values, such as a male-dominated relatively rigid social system, or a hatred of Marxism and capitalism (in theory), were eroded by technique. In their place came the western "virtues" of materialism, efficiency, modernization, production, and "equality." Furthermore, the means used to overthrow the Shah and embarrass the United States were those of modern technique. Manipulated television images, brandished weapons, petro-dollars, and social methods like demonstrations were among the various techniques used. Thus, in this case, technique was used to remake society and overwhelm the influence of the Islamic faith.

In addition, Ellul argues, technique is religious in a second sense. Modern technology has usurped the place of the sacred. A deity is not venerated because the deity is not seen and is therefore not amenable to manipulation and calculation. In place of the deity, we "praise" technology. And while this praise is not literally doxological, it is veneration



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nonetheless. The optimists' faith in humanity is projected onto the technical object constructed by instrumental rationality. The triumph of human ingenuity becomes a "technical triumph." The pride that wells up within us when, say, the steam engine is unveiled, is attributed to the object itself. And thus Ellul contends,

Nothing belongs any longer to the realm of the gods The individual who lives in the technological milieu knows very well that there is nothing spiritual anywhere. But man cannot live without the sacred. He therefore transfers his sense of the sacred to the very thing which has destroyed its former object: to technique itself.⁴

Technique is the primary and unique form of modern desacralization.

The triumph of human ingenuity becomes a "technical triumph." The pride that wells up within us when, say, the steam engine is unveiled, is attributed to the object itself.

Technique's power is not restricted to the domain of the sacred. Its power is palpably manifest in the bureaucratic process. Seemingly endless streams of divisions and subdivisions, administrators, rules, forms and procedures constitute the modern form of authority for many social processes. Efficiency, speed of access and exit, and expert knowledge became the key intellectual virtues one needs to negotiate the bureaucracy. "Specialization," mastery, and rote recall became the goal of education *qua* well-oiled educational pipeline. This process is especially evident in modern academia.

Ellul maintains, moreover, that technique dominates science. Methods, procedures, classification, controlling variables, and the manipulation of material (like gene manipulation) suggest that science itself is dominated by technique.

We may object that sport and play are certainly not dominated by technique. Play represents the free movement of the human body according to an athletic imagination. While this may be true in childhood, consider how children are trained in play. The effervescent little youngster becomes introduced to techniques of play that will enhance winning. Specialization is encouraged in an early age. Motion,

thought, and raw ability are transformed into efficient movements and well-practiced, repeatable operations that are machine-like in their quality. Is it any wonder, therefore, why we label our preeminent sports personalities with technological metaphors? In the 1970s, baseball's Cincinnati Reds were called the "Big Red Machine" because of their power, efficiency, speed, and productive capabilities. These professionals played on "Astroturf," a space-age product whose name and function serves to technologically separate play from nature.

We know Marxism and socialism are infamous for their methodological control of the market. Is capitalism similarly controlled? Or is the market free of the grip of technique?

Technique is no respecter of economic views or geographic boundaries. Industrialization is an example of a world-encompassing ideology.⁵ Communism, socialism, and capitalism are all driven by the same mechanical techniques.⁶ We know Marxism and socialism are infamous for their methodological control of the market. Is capitalism similarly controlled? Or is the market free of the grip of technique?

In *The New Industrial State* John K. Galbraith argues that markets are no longer free, if by free we mean separated from large governmental, organizational, and bureaucratic influences. The larger and more complex the technology used in competitive markets, the greater will be the requirements of specialization, capital commitment, and most importantly, market manipulation. Galbraith calls this organization the "techno-structure." This techno-structure serves several necessary functions. Because economies of scale require large pools of labor, individual worker freedom must be subordinated to corporate management objectives. Experts are placed at the head of each division to facilitate greater speed and efficiency in decision-making. This entire corporation, argues Galbraith, forces the individual to adopt, identify with, and become motivated by company directives. The company becomes a unified productive process. Promotion and recognition depend upon adapting to the prime directives. The same must be said for economic desires in the market. They must be manipulated in excess of needs so profits can meet capital requirements.⁷ In fact, this manipulation is really seduction because we believe

we are "free to choose," to use a phrase made famous by noted economist Milton Friedman. Glutted consumer markets mean unemployment. Mass production *must* mean not only production and consumption by the masses, but massive consumption by consumers and producers.

Technology defines the universe we live in, by using cause and effect metaphors to describe the laws that govern reality. When viewed in these mechanistic terms, God loses the role of personal, providential sustainer of the creation, and an impersonal deus ex machina, a god from the machine, is substituted.

Ellul argues that technology has become personal. He feels that the preeminent symbol defining humanity has become *Homo faber*; man the tool maker; information processing systems; complex computers. Furthermore, technology defines the universe we live in, by using cause and effect metaphors to describe the laws that govern reality. When viewed in these mechanistic terms, God loses the role of personal, providential sustainer of the creation, and an impersonal *deus ex machina*, a god from the machine, is substituted. And, continues Ellul, if we think that the main branch of the Judeo-Christian culture does *not* understand God in these mechanistic terms, we are mistaken. We understand evil as inexorable, just as we understand technique as irresistible. Ellul goes so far as to argue that technique is so totalitarian in nature that it offers successful resistance to God's counter-veiling love.⁸ "The dawn of the enslavement of the worker, the destruction of the environment and the bombardment of the consumer with a world of gadgets,"⁹ these unmitigated evils are proof to Ellul that God has not chosen to resist evil.

The modern state enhances the scope and the ideological impact of technique. The state can use various techniques to control the military, administrative and social sectors of culture. "The basic effect of state action on technique is to coordinate the whole complex. The state possesses the power of unification, since it is the planning power *par excellence* in society."¹⁰

The nuclear industry is a case in point. The federal government funded the initial research for the splitting of the atom. Then we funded the "Atoms for Peace" project. Using the process of fission, we hoped to create a major source of cheap, abundant power. The problems of clean-up, burial of wastes, leakages, and explosion have demonstrated that the splitting of atoms has not been an entirely "peaceful" project, nor has it been a local one. Indeed, the federal government has furthered technique's power by strengthening the bureaucratic/administrative system that surrounds fission. The variety of technique surrounding Hanford Nuclear Reservation in the state of Washington is the best example of this technical problem: technique (bureaucracy and on-line equipment) was created to put Hanford on nuclear line then technique was used to clean up fission's mess.

Technique is, moreover, ecumenical and international; it canvasses the whole earth remolding different cultures into one more or less unified world system.

Technique is, moreover, ecumenical and international; it canvasses the whole earth remolding different cultures into one more or less unified world system. Therefore, as technical objects are transferred from "first" to "second," to "third," and now "fourth" world countries, ideology travels with them.¹¹ That is, technique transforms the social fabric to meet its needs. Nowhere is this fact more apparent than in the social transformation that caused the Industrial Revolution. Indeed, the very designation "First," "Second" etc. suggests that the degree of technical sophistication contributes to a nation's international standing, self identity, and place of importance.

Ellul believes that technology is autonomous; it is a law unto itself.¹² It is self-augmenting, self-replicating, and beyond human control.¹³ Technology reinforces itself. Robots replace workers on assembly lines. Technique, argues Ellul, is self-directing. Technique directs reality. Everything must be made to conform to its dictates. The life that surrounds our automobiles is a good example. Traffic lights direct our pathways. Congestion crowds our highways. And "gridlock," or technique that chokes movement, is the result. There is a terrible irony to the word "auto-mobile," or self mobility. There is precious

little freedom or mobility left on our roadways because of the automobile.¹⁴

Technique is a monism, that is, a universal force. It is one all-embracing power ecumenically uniting what appear to be divergent ideologies. Furthermore, technique is monistic in the sense that it acts as a blind force reigning alone in the world in a manner that appears to be more clear-sighted than human reason.¹⁵

I must note a profoundly demonic irony at this point. Since the Enlightenment, much of western civilization has confessed itself to be autonomous. We have defined ourselves as people who are free. We invent, therefore, automobiles to enhance our self mobility. Having become widespread, our "mobility" degenerates into death and gridlock. That is, we are forced to surrender our freedom to our vehicles of mobility in auto-deaths, congestion, and related losses.

*We invent, therefore, automobiles
to enhance our self mobility.
Having become widespread, our
"mobility" degenerates into death
and gridlock.*

As I have said, humanity has sought to secure our freedom by the rationalization and mechanization of nature. Ironically, we have robbed ourselves of our freedom and authority by projecting our alleged autonomy onto our machines, methods, and systems. While seeking to be free, we have become enslaved. While wrestling nature for our freedom, we have subjugated ourselves to our technique. Perhaps the optimist might call for a technical solution to this loss of freedom. Maybe a "fun-filled" vacation to Disneyland would help!

Ellul further claims that the microchip has not brought a resurrection of democracy. It has eroded our privacy, as our government and our credit card companies increasingly can access data of the most private sort.¹⁶ The "information society"—saturated as it is with every form of verbal bombardment—nevertheless lacks wisdom. This society, dripping with information, must define people as information or data processing systems.¹⁷ I will return to this theme of "the information society" later in this article when I review Ellul's most recent book on technology's influence on modern life.

Technological Determinism?

May we conclude from this discussion that Ellul is a technological determinist? I have believed so, because he argues so strongly and convincingly for technique's totalitarian effects. His views do not seem to allow any room for freedom in our lives as a consequence of technique. I have come to see, however, that this charge of determinism is superficial. This was made clear to me as I read Ellul's theological works, with their different presuppositions. In this section on ethics and theology we will listen to the other half of Ellul speak. This aspect is no less important than his sociological side, the facet of his work we have just covered. Taken together, the two concepts form the foundation of Ellul's thought.

I would argue, in agreement with D. J. Wennerman,¹⁸ that Ellul's essential "method" is dialectical in character. It may be remembered that in Marx's thought we find a dialectical method of interpreting history. Accordingly, two contradictory forces—the revolutionary class-created thesis/antithesis—form the dynamic of history. Ellul also makes use of a dialectical method of interpreting history, though his is not of an economic nature. Ellul's essential dialectic revolves around "two totalities": that is, two mutually exclusive, all-encompassing ways of thinking.¹⁹

From the beginning my thinking revolved chiefly around the contradiction between the evolution of the modern world and the Biblical content of revelation.²⁰

This "evolution" Ellul speaks of is best portrayed by the thought of Karl Marx. Thus, methodological Marxism and Christianity are the two totality ethics that together and in contradiction form the basis of Ellul's thought.

I realize that Christianity was a totality implying an ethic in all areas, and that Marxism too claimed to be a totality. I was sometimes torn between two extremes, and sometimes reconciled; but I absolutely refuse to abandon either one. I lived my entire intellectual life in this manner. It was thus that I was progressively lead to develop a mode of dialectical thinking which I constantly made my foundation.²¹

The contradiction between methodological Marxism and Christianity may be expressed as follows. Marxism is materialistic, dialectical, prone to determinism, and holds autonomy as an important human virtue. On the other hand, Christianity incorporates the goodness of the material world into a more holistic picture, is more decentralized, less myopic, and is heteronomous in nature.

Ellul makes no attempt to synthesize these two contradictory ethics. Indeed, to do so, say in the form of a "Christian" world view, would be to create an ideology or another totalitarian method of control. Contradiction is a must. Contradiction produces tension. Tension is necessary because it produces action, an action that addresses technique's problem. We have the opportunity to address this tension because — and this is key — we are capable of responsible free decision. It is an existential, authentic human encounter with technical reality that necessitates a free decision.

What does all of this philosophy have to do with technique?

It is by developing this dialectic that Ellul is able to carry out his task of relocating humankind within the modern technological universe. What is lacking in such a universe is precisely that openness that allows for the historical development of the free subject. For technique, in Ellul's view, represents a closed world. Its development is completely mechanical. Its results are completely predictable. Ellul's dialectic itself introduces a certain negativity and thus unpredictability into this technical system. It represents a negation of technique.²²

The last phrase, "negation of technique," is the signal for yet another contour of Ellul's basic dialectic. Ellul's system of thought fundamentally consists of technical necessity on one hand, and the possibilities of human freedom on the other hand, freedom being an absolutely essential condition for human existence.²³ Ellul sees the human spirit, longing to be free, arising like an unstoppable force against the immovable object of the technological necessity.

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Ellul believes the gospel, the truth of Christian revelation, must confront the known sociological world that is dominated by technique. The gospel that confronts the sociological world dominated by technique is an alien truth to this world, *but is capable*

in some unfathomable way of contradicting the way of servitude. This way of contradiction, however, is rarely if ever realized in human history.

Thus, there exists a profound dialectic in Ellul's thought: the existential, theological need to be free is pitted against the sociological, technological necessity of a technological society.

A second dialectic also exists. The sociological side of Ellul views the world through the glasses of empirical, evolutionary reality. Accordingly, the visible, verifiable, measurable way of seeing reality comes to the foreground. On the other hand, Ellul also views reality as a theologian. Faith, the grip of Divine revelation, extra-material reality are the dominant presuppositions to this way of thinking. Taken together, though never synthesized, the principles of empirical vs. transcendent reality form the second dialectic in Ellul's thought. Faith vs. empirical seeing, evolution vs. unfolding, verifiability vs. faith in the unseen, and sociological facts vs. theological beliefs form the second dialectic in Ellul's thought. Again, no synthesis is allowed.

Ellul's Theology

Talk of transcendent reality naturally leads us to a discussion of Ellul's theology, the core notion of which is freedom. I will return to Ellul's notion of freedom as a necessary antidote to technological necessity shortly. As I do, we will probe more deeply into the origins of Ellul's theological beliefs, and find the forces capable of lifting Ellul's perspective from the depths of technological determinism.

Ellul believes there is no activity around which all of life should revolve; there is no absolute. Everything and everyone is dependent or contingent upon God. Therefore, it is not possible for humans to absolutize or make a universal truth out of anything or any process.²⁴ Thus, Ellul says in "faith" that technique cannot be absolutized. Faith addresses God with the full confidence that evil is not sovereign, is not absolute. Belief, on the other hand, represents confidence or trust in something or someone other than God. We *believe* the world is not flat because we have been told it by those whom we trust. Belief is concerned, moreover, with "religion." "Religion binds people together and binds them as a group to their god."²⁵ Reason, science, technique or money can be deified. Belief is thus false faith, according to Ellul.

It follows that Ellul would resist technique as evil with much the same vigor that a prophet would resist evil. Thus, "progress has become a key term

in modern religion,"²⁶ a religion supported by the belief in human reason and its power to dominate nature in the name of freedom. This religion does not lead to freedom, claims Ellul. It leads to bondage and oppression, a loss of personhood. Belief always tries to construct something to trust in — some force it believes to be a god.

In short, Ellul is a pessimist when he contemplates what he sees that technique has contributed to the human condition, and what it will contribute in the future.

Ellul places himself at odds with the technological optimists. They seek their earthly salvation, or fulfillment, in technique; Ellul sees demonic servitude. The optimists sound their praise for technical progress; Ellul sounds the lament of the prophet for the captivity of humanity to technique. They celebrate reason, autonomy, and progress; Ellul mourns because of this counterfeit trinity. The optimists believe that humanity will significantly reduce, if not eradicate, life's perplexing problems by technique; Ellul believes the destruction brought on by technique greatly exceeds its goodness. In short, Ellul is a pessimist when he contemplates what he sees that technique has contributed to the human condition, and what it will contribute in the future.

Ellul argues for the meaningfulness of life, as a Christian would. Technique has not made life absurd. Mindless consumption, the nuclear arms race, or suburban shopping malls — all particular manifestations of technique — are in his view absurd. But these particular absurdities do not constitute the essence of a meaningful life. Life is not oriented to, nor does it find its significance in, technique. Life is given meaning by God, which technique cannot altogether eradicate.

Upon what basis does Ellul establish his view that life has meaning? The answer to this question is crucial, as it represents the core of Ellul's theology.

I myself have been gripped by the unique and irreplaceable character of the word, but for very different reasons: because God created the world, because he has revealed himself uniquely by His word, because the incarnate Word is the Word of the eternal God, because the God in whom I believe is Word ... there is order and truth in reality.²⁷

Though technique does overpower us on the human level, God's word is not subject to this domination. God's word is free to address us because it is a transcendent word. This word "above all earthly powers" (to use Luther's famous phrase) speaks to us and for us, and thus resists the demonic powers of technique. When God addresses us in his word, supremely seen in Jesus Christ, we find the clarity of mind and will to truly "see" reality as it is. The consequence of this vision is the power to act freely and responsibly. Thus, "enlightened" by God's word, Ellul can understand the difference between, for example, the relative verbiage of computers and the clarity brought by God's word. Thus,

Computers can understand human phrases relating to acts and limited objectifiable concepts. They can give information and obey orders. But they plainly have nothing whatever to do with word or speech.²⁸

Ellul roots his understanding of the dialectical way of thinking — again, central to his thought — in his faith in God. Dialectical contradictions are inherent in reality, just as God's word is basic to reality.

Ellul roots his understanding of the dialectical way of thinking — again, central to his thought — in his faith in God. Dialectical contradictions are inherent in reality, just as God's word is basic to reality. The term "word of God" can signal a call to "dialogue," but also to contradiction or to distance. The word of God — our grace — contradicts our sin, or technique. Ellul wants us to "dialogue" with God's word because of our sin. We are called to dialogue — to regain true communication — in the midst of the computer age because of the idolatry of technique. We are inclined by our sinful nature to idolatry — to making ultimate that which is finite in the creation. Thus, reality is inclined to manifest a two-sidedness, a yes and a no, a positive and a negative, grace and sin. The positive and the negative, sin and salvation, do coexist; they do not rule each other out. Ellul confesses that each force is essential for the other's continued existence. Thus, the evil of technique is necessary for the good of redemption.

Negativity is essential, for if the positive remains alone, it is unchanged, stable and inert. A positive

element, for example, an unchallenged society, a force without counterforce ... is enclosed within the permanent repetition of its own image.²⁹

Ellul sees this dialectical way of thinking manifest in the biblical record.

The root of Ellul's pessimism can be located in his dialectics.

I might say that it is a dialectical attitude that lead us to consider that we are impotent in relation to structures and necessities but that we ought to attempt what can be attempted. The same attitude causes us to affirm constantly that as an expression of determinism and as an exclusion of freedom, society must be unceasingly attacked, and yet that all our efforts will tend to maintain this society³⁰

The "structures and necessities" refer generally to sin and specifically to technique. And while this statement taken alone may lead one to conclude that Ellul is a technological determinist, the rest of Ellul's work speaks differently. Ellul speaks in the next chapter of the same book of "harmony," of a "correspondence," a joy, a simultaneity of occurrences, a fullness of being that surely contradicts the bleak, myopic picture painted of the technological society. Thus, in some sense, salvation — harmony, correspondence, joy, simultaneity, a fullness — of life's many activities is thought to occur.

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We must not be confused at this point. After having set before us the overwhelming evil of technique, Ellul confronts us with the all-encompassing possibility of redemptive harmony. Taken *together*, these two contradictory ideas form a dialectic, a dialogue between contradictory statements, the purpose of which is to move us to action, to resistance to evil, to confrontation with technique.

Nevertheless, it is crucial in understanding Ellul's dialectic to see that while technique *actually* rules history, harmony represents our hope for (not in)

history. Ellul's lack of specific examples of harmony leads to confusion and uncertainty as to what he is proposing. "Let us return to the earth and try to make it humane, livable, and harmonious. This is our real business Let us rediscover the earth in joy."³¹ We are asked to return to the earth — the place of the domination of technique — but find there no literal place of freedom or a program of action.

We must further clarify Ellul's notion of freedom. We may thus far conclude that Ellul minimizes the human ability to resist evil. Consequently, we can experience little or no freedom because technique dominates history. The question continues to haunt us: is Ellul a historical determinist, or is he not?

Ellul's dialectics demand that as much attention be given to the notion of freedom as has been given to technical necessity. This is a difficult task, because Ellul has said technique is a universal, monistic, ecumenical or global, and self-augmenting force. Therefore, the freedom he is about to define must be equally fundamental to human existence, as it must bear the enormous burden of being a counterweight to technical necessity. "Freedom is the ethical aspect of hope. An ethic of freedom can be found only in hope and can only try to express hope."³² Freedom does not spring out of hope by a kind of necessity. Freedom is the real and authentic possibility of choosing one's destiny. Freedom is created by God for humanity in humanity (or in Jesus Christ). Hope is the response of man to God's love and grace; while freedom is the response of God to man's hope. Freedom and hope are absolutely essential characteristics of humanness.

That is, God's glory, honor, might, and freedom exceeds and originates our reality, included in which is the enslavement of technique.

It is central to Ellul's thinking that God be the author of freedom. God's existence is said to be transcendent to that of our own. That is, his glory, honor, might, and freedom *exceeds* and *originates* our reality, included in which is the enslavement of technique. Ellul finds in the transcendent God the *only* source of freedom sufficient to rescue us from the *gulag* of technique. Since history is bound by technique, only a God who stands above and beyond history, who is not tainted by technique, can give us the hope

of freedom. Only God can give humanity the *possibility* of living out hope in a practical way in daily life, claims Ellul.

While God's existence is transcendent to that of our own, his³³ relationship to us is not. God is fully revealed in Jesus Christ. Christ, though fully God, is fully human as well. Christ enters into our world as a fully *immanent* link between humanity and God. It is the immanent link that forms the basis for the possibility of freedom from the vice-grip of technique. ".... Destiny has been lifted by the act of Jesus Christ." After him "there is no more ineluctable necessity."³⁴ This "act of Jesus Christ" that Ellul is referring to is the destruction of all oppressive powers by the kingdom or the rule of God.

Freedom means the liberation from technique's domination. Because Jesus Christ is free from sin and death and because he is in us by his Spirit, we have the hope of freedom. This freedom releases us from alienation and reconciles us to all of life's vital and holistic forces. Freedom, more specifically, means that we are no longer possessed by anything external to ourselves. Money, sex, fame, security, and above all, technique, no longer rob us of our freedom. I am no longer "*Homo faber*" (as Marx said) or an "*information processing system*" (as some modern computer experts say). I am a free human being: vital, alive, complex in being, and reconciled to myself and to the world around me in Christ.

Because Jesus Christ is free from sin and death and because he is in us by his Spirit, we have the hope of freedom. This freedom releases us from alienation and reconciles us to all of life's vital and holistic forces.

Freedom and hope offered in Christ do not exist only for our personal lives, however important that may be. Rather, freedom is extended to the entire world. It represents a hope that we can have the possibility of an authentic future instead of one determined by the dialectics of history.³⁵ Thus, Ellul does not envision the dialectical way of being as eternal. Dialecticism is the necessary accommodation to the evil of this world. We are being led, he continues, now speaking as a theologian, to a world that will become a heavenly Jerusalem,³⁶ a world freed from evil and dialecticism.

Ellul's emphasis is not oriented totally to another world. He sees that this world is also important. However, it is critical to note that when we press him for concrete details as to how his view of freedom can positively affect history, Ellul says there can be no Christian factory or a Christian philosophy, no concrete alternative. That is, no *historical* event or project may be labeled Christian because to do so would be a supreme act of arrogance. Whenever the Church has tried to identify some project like the Crusades as Christian, it has only served to enhance an ideology of oppression, claims Ellul.

Just as the reader begins to believe life is socially determined, Ellul reasserts the need for freedom.

Ellul, the social critic, can not speak of freedom for too long. He must return to the theme of "determinations." There are social forces at work that oppose our need for freedom. Economic alienation, or class hostilities, is the first determinant. Second on Ellul's list are sociological determinants. Urban environment, organizational techniques, mass media's manipulations, and the expansion of the state are among the social determinants. Indeed, the modern state has eroded the freedoms of democracy by its manipulation of voter preferences. However, just as the reader begins to believe life is socially determined, Ellul reasserts the need for freedom.³⁷

Does freedom originate with God? What meaning can it possibly have in the historical world of necessity or determinations?

Freedom has meaning only in relation to an authentic necessity. Freedom is fate overcome, an obstacle surmounted, a limit passed, a sacred sphere secularized Freedom loosens up tightly regulated mechanism³⁸

Freedom/necessity: the Scylla and Charybdis of modern existence? Indeed, are the terms hope, freedom, and heavenly Jerusalem historically relevant? Perhaps we will discern a change of tone in Ellul's more recent critique of technique. Has he softened his critique of technique? We shall let him speak:

My warning today is the same as 1954, when I wanted to alert people to the future potential of technique and to the risks entailed by its growth so that they might be able to react and to master it, lest otherwise it escapes their control.³⁹

As was true in the *Technological Society*, first published in English in 1964, the master critic of technique wants to expose the deception, overconfidence, the misleading nature of modern technique. The modern technological bluff consists in rearranging everything in terms of technical progress. Politicians manipulate media images to create the illusion that *your* cause is their cause. The media showers us with pseudo-images, trying to convince us that this, that, or the other product will fulfill our deepest needs. The economy is manipulated like an overstuffed chicken so that it can produce the kind of economic growth we desire. All of these particular *methods* of manipulation (and many more besides) have heightened the mesmerizing narcotic of modern technique.

Ellul continues. Prior to 1950 we lived by the imperialistic metaphor of the Industrial Revolution. Starting in the middle of the eighteenth century, man, machine, nature, and nurture⁴⁰ were all coordinated into an efficient productive system of wealth production, the affluent products of technique.

The information revolution has produced the new imperial metaphor of the information society. Information is our new environment.

Today the technical metaphor has changed, but the oppression has not. The information revolution has produced the new imperial metaphor of the information society. Information is our new environment. We awaken in the mornings to our clock radio. We listen for the weather and traffic conditions (the latter often oppressive, especially in larger cities) on our car radio. We then move to work where a computer, a fax machine, and mail inundate us with more information. We return home to our television sets sometimes to find a dozen or so channels flooding us with information. Finally, we may close our day by reading a book. Ellul, therefore, argues that we live in an information-soaked society, a society that, nevertheless, is lacking in wisdom and ethical sensitivity. Thus:

I refer to the fact that technique is our environment, the new "nature" in which we live, the dominant factor, the system. I need not elaborate on its features: autonomy, unity, universality, totality, automation, causal progression, and the absence of finality.⁴¹

And so the prophet sounds the same warning today that he did over thirty years ago.

Ellul carries the battle to the heart of technological optimism. He critiques Julian Simon's notion of linear progress. He calls Simon's thesis "absurd." Simon believes the economic market to be a place of pure and perfect competition where supply and demand will *automatically* balance and will consequently produce optimal social conditions. Workers, technical innovations, and capital sources will combine to eliminate all long-run (hence linear) concerns, concerns running the gamut from food supplies to energy "needs." This is Simon's argument. Even if optimal resources were to be allocated, and Ellul doubts they will, the resulting market structure that regulates this "brave new world" would be totalitarian in nature. People caught in this omnivorous economic organism would become one undifferentiated resource passively waiting market manipulation and exploitation.⁴² Indeed, this has been the legacy western capitalistic imperialism has left the world.

Second, Ellul argues that Simon's facile optimism knows no social limits or ethical norms beyond economic growth.

The optimism of this economist rests, then, on an absolute belief in unlimited progress. Whenever a difficulty arises, "technical progress will deal with it." We have here an absolute form of the technological bluff.⁴³

Economic progress, under these conditions of optimal economic growth, becomes *social regress* — social retardation — according to Ellul. The different aspects of society, like education, government, and the natural environment, lose their integrity to the god of technique, so the prophet argues. And with that note, Ellul rests his case — the case for our defense.

Pessimism Continued: Neo-Marxism

I do not want to give the impression that Ellul's work is the only one that is pessimistic about technology's place in our lives. In fact, I want to turn to the Marxist school of thought to show additional strains of pessimism.⁴⁴ I have noted that Marx was optimistic about the future of technology. This optimism is not shared by one of the chief modern disciples of Marx.

Jürgen Habermas stands as one of the luminaries in neo-Marxist thought. His book *Technik und Wis-*

senschaft als "Ideologie," or Technology and Science as "Ideology," is his major work on the subject of technology's effect upon modern society. Unlike Marx, Habermas does not envision the workers taking control of technology, removing the alienation that exists between themselves and the works of their hands, and realizing a bounty of goodness. Rather, "the liberating power of technology—the instrumentalization of things—is perverted into a fetter of liberation: it becomes the instrumentalization of man."⁴⁵ Modern technology has chained or bound modern humanity to instrumental reason. Humans have become *things*, or parts of the production process. This has certainly become true for the worker Marx wanted to liberate. The worker has lost his freedom, and self-determination to technique. The modern assembly line testifies to this fact. Since the Industrial Revolution humans have been forced to attune their efforts to the dictates of the assembly line—when they were employed. Today robotics, the branch of technology that has mechanized and routinized human labor, has provided mechanical replacements for many assembly-line workers.⁴⁶ Nowhere is this more apparent than in Detroit, the former capital of assembly-line labor.

It is noteworthy that a neo-Marxist like Habermas would use the word ideology to refer to technology. Marx argued that the capitalistic ideology dominated society and its agenda. Technology, now co-opted by the capitalist, has become the modern origin of human oppression.

Habermas believes that ... science and technology have become the embodiment of an ideological tool of oppression.

Habermas takes a different tack from Marx's state dominated ideology to alleviate oppression. Habermas believes the state has increasingly intervened in society to assure economic progress. The state attempts economic progress by co-opting science and technology, and then by using them for economic ends. The net result is that science and technology have become the embodiment of an ideological tool of oppression. While the optimistic Marx believed a state-owned technology would bring Utopia, the pessimistic Habermas believes the modern state-controlled technology only serves to oppress us. Thus, Habermas will have nothing to do with state domination.

Habermas believes that technology and science dominate or oppress people in the name of "progress." This "unfreedom" appears neither irrational nor totalitarian, but appears in the guise of leisure, wealth, and increased status.⁴⁷ This statement is more true now than when Habermas wrote it. Leading journals in science and technology are calling for increased federal involvement in science and technology (and the United States federal government is listening). In fact, some are noting the emergence of "a U.S. 'technology policy,' in which the federal government helps develop and provide access to the technical knowledge on which the competitiveness of commercial enterprises depends."⁴⁸

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Habermas' view is that as politics surrenders its integrity to science and technology, the democratic will to resist technology's domination lessens. People are hypnotized and drugged by technology's effect. This narcotic effect is certainly true of our existence in front of the "tube." Televised political debates give the *appearance* that the electorate is viewing debates involving substantive issues vital to our democratic future. In actuality, we are witnessing the manipulation of images geared towards producing a desired political feeling. Substance has vanished. The legacy of Ronald Reagan's presidency is ample testimony to this reality. We are "hooked" on images.

An understanding of the religious importance or imperative of autonomy for optimism and pessimism is crucial for this article. First, the pessimists' notion of autonomy must be more thoroughly explored. Habermas maintains that we do not enjoy autonomy; we must settle for quasi-autonomy.⁴⁹ We believe we are free to consume and enjoy leisure as we please. In fact, according to Habermas, "Industrially advanced societies seem to approach the model of behavior control...by reconstructing [our lives and natures] after the model of self-regulating systems of goal-oriented and adaptive behavior."⁵⁰ Accordingly, "technocrats"—technologically advanced experts—are consulted for advice that can be used to manipulate behavior. Advertising executives

know that technically choreographed sex sells blue jeans. So they place two young, well-endowed members of opposite sexes in a "bump and grind" position, and the message is clear: wear these jeans, engage in these actions and your sexual fantasies will come true. Thus, the ideology of technology determines our lives and corrupts our freedom. Marx failed to realize our enslavement by technique, claims Habermas.⁵¹

Habermas opposes the exclusive domination of what has been called instrumental rationality or reason used as a means to the end of manipulation and control.

Habermas opposes the exclusive domination of what has been called instrumental rationality or reason used as a means to the end of manipulation and control. He believes that communication and social mutuality must replace the reign of impersonal, manipulative instrumental reason. Only then will we become "dominion free," or freely emancipated individuals. Accordingly, communicating and interacting should not have control as their goal. Rather, individualization and choice would become the new virtues.

Habermas, like Marx, wants a revolution. Unlike Marx, however, Habermas' revolution does not involve alienated workers. Rather, circa 1969, Habermas appeals to students who have prospered because of economic and technological progress. These students, from high income, highly motivated families who are not themselves the product of authoritarian homes, must be enlisted for this "revolution." These students are the locus of his hope and salvation. These are the new social elite who, because of their privilege, can distance themselves from their peers and thus form the basis for protest. These elite will protest the technocratic, "achievement ideology" of western life. These students can turn to a thorough critique and renewal of technology because their wealth, status, and eventual success are assured. This grand vision is predicated upon the wealth and leisure that technique brings.⁵² Technological fruits make the critique of technology possible, claims Habermas.

The last point needs to be emphasized. Technological fruits give elite students the resources necessary to take distance from technique and thus form the basis of critique. Habermas does not seem to

be a dire pessimist like Ellul. Instead, Habermas' pessimism seems to be moderated by his need for the fruits of technology. Without wealth, leisure, and status, students' protests may never occur. Therefore, I label Habermas a secular conflicted pessimist, though without Ellul's dialectical methodology. The conflict centers around his repudiation of state-controlled technology, which he portrays as wrong. On the other hand, Habermas' ideas need the fruits of technology to give students the resources necessary to critique technology.

Pessimism Continued: A Representative Christian Theologian

There is yet another form of pessimism: soft pessimism. The work of Nicholas Berdyaev in *The Bourgeois Mind and Other Essays* is an example of soft pessimism. This Christian thinker can speak of the powers of technique as "absolute," "the thing placed above man" and capable of bringing destruction to culture.⁵³ He seems to give it an autonomous character when he says that,

Technique knows no symbols; it is realistic, reflects nothing, creates only new actualities...; it divorces man from nature and from others.⁵⁴

Furthermore, God, according to Berdyaev, creates organisms that are interconnected with all else, whereas organizations — bureaucracies — are neither generated by or capable of life. Organizations grow and develop and create their own impositional character. "The supremacy of technique and the machine is primarily a transition from organic to organized life, from growth to construction."⁵⁵

Such a situation can only produce "hopelessness," a "new cosmos of its own creation" with unforeseen consequences. The origin of this alarming condition is the alleged autonomy of the machine. This machine spells the ultimate end of man and nature. Thus,

the wireless will be carrying the sound of music and singing and the speech of the men that once lived; (nevertheless) nature will be conquered by technique and this new actuality will be a part of cosmic life. (Therefore), man himself will be no more, organic life will be no more — a terrible utopia!⁵⁶

Nevertheless, Berdyaev does not seem to be a strident pessimist, as is Ellul. While noting technology's evil — potential or real — he does not absolutize human freedom. He ties the machine to human responsibility which in turn results in at least two consequences. If machines are not laws unto them-

selves, then they may be made to be subject to other laws and customs that could regulate their existence. If machines could be made to obey external laws they then can be made to be responsive to human demands. They can serve in a way that frees rather than enslaves us.

It is not machinery, which is merely man's creation and consequently irresponsible, that is to be blamed... it is unworthy to transfer responsibility from man to a machine. Man alone is to blame for the awful power that threatens him; it is not the machine which has despiritualized him — he did it himself.⁵⁷

Berdyayev halts his slide into strident pessimism by linking the machine to human responsibility. Machines are not therefore autonomous but are tied to human responsibility. Man has the *potential* to control the machine.

Nevertheless, it is appropriate to speak of Berdyayev's pessimism because he uses such words and concepts as "absolute," "destruction of the culture," and "divorce from nature" when referring to technology's effect upon contemporary life.

Pessimism Discerned

We may be inclined to be cautious in accepting Ellul's or others' diagnosis of our technological situation. Given most people's inclination to moderation and aversion to extreme negativism, we may be inclined to accept only some of their thinking. Our experience of technology may not be so negative. We drive our cars and experience the freedom of mobility. We may have taken our children, or traveled ourselves to Disneyland, and not thought of it as the "ultimate idiocy." In everything from electricity to modern medical technology our lives seemed to have been bettered by technique, or at least they are not as doleful as the pessimists would have us believe.

This moderate position is, in my opinion, naive and simplistic. The Judeo-Christian tradition has always confessed that humanity⁵⁸ was made in the image of God. The image involves many attributes, but must never to be cheapened by worshipping and serving — glorifying and modeling — any one aspect of the creation. When Frederick Taylor created a technique for workers to mimic the motions of the efficient machine, so that more economic rewards could be gained, our image was corrupted. That is, we have surrendered a measure of our dignity, complexity, worth, creativity, and responsibility to the dictates of the machine. Thus, I am inclined to agree

with the pessimists when they say, "The machine demands that man assume its image; but man, created in the image and likeness of God, cannot become such an image, for to do so would be equivalent to his extermination."⁵⁹ Machines are to serve humans, not humans the machine. When persons do surrender parts of their humanity to the machine, we must be alarmed.

Machines are to serve humans, not humans the machine. When persons do surrender parts of their humanity to the machine, we must be alarmed.

If we are not alarmed, we may legitimately begin to wonder if we haven't become duplicitous. Perhaps we attempt a weak, shallow, abstract critique of technique while lavishly enjoying its alleged benefits. Our lifestyles betray our real commitments.

Our pollution, gridlock, and even deaths that result from our steel chariots of "self mobility" speak more loudly to our commitment to technique than do our glib clichés of moderation. We as consumers are demanding light-weight, speedy, pollutant-emitting machines that provide the means for us to destroy life — quickly or gradually — at an unconscionable rate. It is blasphemous because nothing in the creation should define our image and anti-rational because it threatens our freedom to "praise" technique.

Our dependence upon technocrats, or experts trained in the efficiency of a given technique, betrays our loss of sense of responsibility and community. Before I would consult a child psychologist for problems my wife and I may be experiencing with our children, I would exhaust the years of expertise in parenting gathered by friends and neighbors. After this, should I need to consult an "expert," then I would compare the advice of the expert with that of the seasoned parents we may know. We can and must trust our judgment as much as we trust the advice of experts. We surrender a portion of our responsibility to technocrats when we refuse to trust our own judgement. To the extent that we have surrendered our responsibility to technocrats and to the extent that pessimists resist this loss of self-determination, the pessimists become prophets in their critique of "expertism."

Technique is universal. Its effects circle and emasculate the globe. I witnessed these destructive effects when I visited the "Third World" country of Zambia, Africa. Between British colonial imperialism and capitalistic modernization, "primitive" Zambian traditions — beautiful and attractive in their own right — were being eroded. Our techniques have a mesmerizing effect. While in Zambia I spent one night watching state-controlled television. The first program I watched was an hour-long documentary, put together by Zambians, about the evils of capitalism and socialist-Marxism and the need for a uniquely Zambian economic ethic. Impressed by this statement, I wanted to sample more. The next program aired was a rerun of the American series "Miami Vice!"⁶⁰ Technique is universal.

Technique has become a false ideology and therefore a detriment to our lives. To view God, as the mechanist does, as a remote watchmaker unconcerned about the intimate affairs of his creation is to miss the personal, providential, parent-like care of God, a confession the Church has made from our beginning. To think the world subject to iron-clad laws of cause and effect, as Descartes⁶¹ did, is to rob us of our responsible freedom. Freedom cannot exist in a deterministic cause-and-effect universe. Whenever the place and importance of technique is exaggerated in our lives, idolatry occurs.

Technique has become a false ideology and therefore a detriment to our lives. To view God, as the mechanist does, as a remote watchmaker unconcerned about the intimate affairs of his creation is to miss the personal, providential, parent-like care of God, a confession the Church has made from our beginning.

While I have agreed that a portion of the pessimists' critique is accurate, and while wanting to avoid a shallow moderation, must we say that the pessimist has most ably discerned the contemporary spirit of technique? I think not. Have you ever seen a machine build itself? Do machines repair themselves? When has a machine started itself? Do machines object to their or our evil or goodness? Machines and technique are *not* autonomous. The laws or principles for technique do not originate in

machines, though in their implementation they can never be realized apart from machines. People make machines; operate machines; repair machines; critique and affirm the place of technique in our lives. In short, we are responsible for the principles by which techniques is developed; technique is not autonomous.

The pessimists attribute autonomy to technique because they believe the myth created by the optimistic secular technologist.

The pessimists attribute autonomy to technique because they believe the myth created by the optimistic secular technologist. Confessing ourselves to be law unto ourselves, we think we see this autonomy all around us because this article of faith is thought to be so crucial to our existence. This "seeing" of autonomy by the secularist is parallel to the "seeing" of theists. Just as the theist sees God's handiwork in the design of nature, the regularities of the universe, the miracle of birth, and the renewal brought about by salvation, so the pessimist "sees" autonomy or, to use Ellul's phrase, "freedom" in "self regulating," "self augmenting" technique. Freedom or exaggerated autonomy is thus raised to an exalted level, its dictates commanding technique which is thought to dominate life. It becomes the chief ethical imperative for escaping technique's all-encompassing world view.

Freedom or autonomy are thought to give life to technological necessity. But necessity demands an equally forceful counterpoint which Ellul calls "freedom." Should not the *gulag* of technique be dialectically opposed by the hope of freedom? Freedom, because of its exaggerated, autonomous character, is thought to be the only force sufficient to resist technological necessity. This dialectical contradiction between the Scylla of technological necessity and the Charybdis of human "freedom" originates in the secular and optimistic exultation of human autonomy, a definition Ellul ironically accepts.

The irony of Ellul adopting the optimistic secular notion of autonomy for his definition of freedom should be noted. By accepting the exaggerated notion of autonomy, or freedom, Ellul becomes deeply influenced by the secular optimistic technologist. Accordingly, instrumental or technical autonomous rationality seeks to remake the world after its own dictates. No boundaries or external laws are per-

mitted to interfere with the march of rationality. This march, or cultural progress, is inevitable and leads to total human betterment. In this optimistic view, freedom or autonomy is central. Accepting this notion of autonomy, Ellul has chosen the same secular, exaggerated core or religious starting point. Therefore, he does *not* bring a *radical* critique to technique as much as he does bring a deeply synthetic accommodation to the core virtue of modern technique, an accommodation Ellul wants to avoid. Believing the myth of autonomy, he can only warn us of technique's imposition. But he can not surgically remove the cancer of technique's imposition because he has not penetrated to the root melanoma: the pretension of autonomy. We pretend — literally make believe — we are autonomous, so the ideology will continue. But as I will argue in a moment, life is not at root autonomous.

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Ellul's dialectical methodology, I must respectfully argue, is not therefore Christian.⁶² Nor does it represent an effective antidote to modern technique. Its roots are in secularity; its tensions provide no ease from the burden of technique. God is the author of all truth. All truth — life's manifold imperatives — is related solely to God. No one imperative — like freedom — can receive substantive exaggeration without other areas of life becoming impoverished and/or exaggerated, again a condition Ellul wants to avoid. By exaggerating necessity, he creates an equally exaggerated need for freedom. At the same time, an equally exaggerated notion of autonomous freedom becomes the only accepted antidote to the determinations of necessity. Thus, Ellul must magnify the degree of human freedom to compensate for the titan of technical necessity. Furthermore, if one thus exaggerates freedom, any "neces-

sity" becomes a threat to that freedom. But Ellul has *not* experienced technique as a threat in all cases. Technique has brought us a degree of freedom. The mass production and distribution of his books, as well as all of the techniques of writing (which Ellul has mastered so well), have made many of us — including Ellul — freer from the grip of technique by raising our redemptive awareness of the problem. In short, by making evil a necessity, an unbeatable force, he must raise freedom to a level of unreformed, even secular proportions.

Neither freedom nor determinism, it seems to me, is the mark of humanness. Responsibility is.

Neither freedom nor determinism, it seems to me, is the mark of humanness. Responsibility is. I do respond to a variety of God-given norms in life, only one of which is the demands of technique. The realization of that choice depends upon a variety of factors like genes, social conditioning, class and gender interests, and above all, sin and salvation. That is, I respond to internal and to external stimuli or "laws," and that response characterizes my humanity. Sometimes the choice for all practical purposes is nil, as in the color of my eyes. Sometimes it is great, as in how and why I write this article. But response to God is always present. The recognition of the responsible character of life will go a long way to dispelling the spirit of pessimism. For if we view freedom as conditioned by God's providential and sovereign care of all of reality and consequently increase our sense of the ability to respond and decrease the sovereignty of sin, then we mitigate technological necessity precisely because we are able to respond, successfully and forcefully, to the challenge of modern technique *and* because God's sovereignty resists technique's alleged sovereignty. God created us to be stewards, care-takers of his creation, and we have the ability *in Christ* to manage all aspects of the creation responsibly.

If my charge of Ellul's accommodation to the secular core notion of autonomy is correct, then he does *not* have two all-encompassing religious ethics, Marxism and Christianity. Rather, his religious root commitment is to a secular notion of autonomy. Thus, his critique and alternative have become less effectual because the root idolatry of autonomy is not discerned. With his only commitment being to one principle — autonomy — I see no Christian "totality principle" at work at the root of his work.

Moreover, this root notion of autonomy does not lead to dialecticism. It leads to an intellectually schizophrenic world view. Two "totality views," *ipso facto*, can not occupy the same life. This fact is especially true if life is confessed to be whole, as Ellul argues.⁶³ Two mutually exclusive set of principles divide and do not unite the person. Autonomy versus heteronomy, sociology vs. theology, reason vs. revelation, freedom vs. necessity, alienation vs. reconciliation: this is methodological schizophrenia. Taken together an amalgam of both sides of the coin can not possibly form totality principles, for no set of principles together or separate are *total* in their command of life. Therefore, Ellul offers no holistic, comprehensive position from which to make a *radical, integral* critique of modern technique, and critique we must. His religious secular commitment to autonomy together with his dialectical method together form a schizoid and therefore not a holistic view.

Finally, as I have briefly argued, Ellul thinks of evil as absolute in the historical area and therefore leaves us without a *historic* hope of overcoming the real evil of technique. True, he speaks of hope, freedom, wholeness, the kingdom of God but never with concrete, historical examples. These lofty words are reserved for the transcendent, supra-historical realm. History is ruled by technique. His works are full of examples of why and how our everyday lives are tyrannized by technique. My critique of Ellul's attempted aggrandizement of historic evil first and foremost comes from the conviction that Ellul's own historic rhetoric will not allow evil to assume the place and significance he allots it. His own dialectical way of thinking calls for "freedom," "hope," "promise," and "joy." That this prophet stands for these virtues testifies to the reality that we do *not* live in a technological society. For at least Jacques Ellul, and many others, do not live for, unto, and because of technique, though our lives have become too permeated by technique.

The problems outlined in Ellul's work are characteristic to one degree or another of other facets of pessimism which I have outlined. Others, like Habermas, have similar flaws. The irony of Ellul's using technique to critique and free us from technique is parallel to Habermas using the fruits or the wealth of technique to create an activist student class of revolutionaries who supposedly will autonomously throw off the "achievement mentality," the root of which is modern technology. The pessimist, in other words, has at the core of his thought a belief in the myth of autonomy which in its technological form is thought to signal damnation while in its humanistic form is thought to be the herald

of salvation. What a dark, conflicted world indeed. Personally, I do not aspire to tension, dialectical thought, or contradictions. Wholeness, integrality, being grounded in Christ in the midst of ontological diversity seem to be virtues and a state that could provide for a more holistic and salvation-filled view of life.



Notes

¹ Jacques Ellul, *The Technological Society*, trans. by John Wilkinson (New York: Vintage Book, 1964), p. xxii. Emphasis in original.

² This piece is part of a much larger work in progress that will attempt to develop a taxonomy for technological assessment. The work will argue that there are at least four fundamental positions that attempt to discern the meaning of technique and the place that technique should or should not occupy within a given culture. As I develop these four analyses I will discuss principles or starting points and laws that both give coherence to a stated position and also outline a world view that is prescriptive for technique's place within society. This project necessarily will be interdisciplinary in nature. I know of no work that has attempted such a taxonomy to date.

For the moment, the reader should note that I have initially presented a brief summary of the positions I will survey: facile optimism for technological optimism; calculating the tradeoffs between the positives and the negatives for the technological realists; and placing technique within life's constraints for the structuralists.

³ Ellul, *Technological Society*, p. 14.

⁴ Ellul, *Technological Society*, p. 143. While I appreciate Ellul's critique of the idolatry of technology, I do not affirm what seems to be his dualistic stance: sacred/secular, spiritual/temporal. Ellul's point, as we will soon see, is that technique has become a monism, or one universal all-encompassing force. Therefore, the notion of dualism seems contradictory.

⁵ Formally speaking, ideology is that body of doctrine, myth and symbol of a social movement that has been put into practice by some cultural and/or political plan. See *The Random House Dictionary of the English Language: College Edition*, Laurence Urdang, Ed. (New York: Random House, 1968). For Ellul's treatment of technology as ideology, see his *The Technological Bluff*, trans. by Geoffrey W. Bromiley (Grand Rapids: Wm. B. Eerdmans Pub. Co., 1990), pp. 172-188.

⁶ See Kai Nielsen, "Technology as Ideology," in *Research in Philosophy and Technology*, (Greenwich, CT: J.A.I. Press, 1978), vol. 1, pp. 131-147. It is interesting to note, in this regard, how both Joseph Stalin and Henry Ford made use of Frederick Taylor's time and motion studies to boost production. See Klemm, *History*, pp. 325, 333-335.

⁷ Ellul, *Technological Bluff*, p. 257 ff. Ellul, of course, views the modern consumption mania as the consequence of the saturation of the market with "productive technologies."

⁸ Ellul's theological beliefs are much more complex than this segment on ideology suggests. For the moment it must be stated that in Ellul's view, from the side of history, God's absence from human history is occasioned by technology.

⁹ Ellul, *Technological Bluff*, p. 257 ff. See note 7.

¹⁰ Ellul, *Technological Society*, p. 307.

¹¹ See, for example, Richard S. Barnett and Ronald E. Muller, *Global Reach: The Power of Multinational Corporations* (New York: Simon and Schuster, 1974), pp. 162-172.

¹² Ellul, *Technological Society*, p. 134. See also Langdon Winner, *Autonomous Technology: Technics-Out-of-Control as a Theme in Political Thought* (Cambridge: The M.I.T. Press, 1977), p. 16 ff.

¹³ Ellul, *Technological Society*, pp. 56, 90.

- ¹⁴Ellul, *Technological Bluff*, p. 371 ff.
- ¹⁵Ellul, *Technological Society*, pp. 93-94.
- ¹⁶I received a "survey call" from a nationally known cable company one day while this paper was being drafted. A representative wanted to know, after he dispensed with some superficial questions, my opinion on the value of cable T.V. The person questioned me about everything from my salary level to my religious (used here in the traditional church sense) convictions. While I was answering questions, my wife told me to hang up because "you are being used." To which I whispered, "I am making a statement. Leave me alone." I finally had to shorten the discussion because I had to keep another commitment. I promised to be near the phone on Sunday, no less, when he would call again. Total elapsed time for this abbreviated survey: one hour and five minutes. Was I or was my wife correct? Where do you suppose this valuable information went?
- ¹⁷Norbert Wiener, *Cybernetics, or Control and Communication in the Animal and the Machine* (Cambridge: M.I.T. Press, 1950), pp. 22, 55 and passim.
- ¹⁸D. J. Wennemann, "An Interpretation of Jacques Ellul's Dialectical Method," in *Broad and Narrow Interpretations of the Philosophy of Technology*, vol. 7, ed. by Paul T. Durbin (Boston: Kluwer Academic Publishers, 1990), p. 181 ff.
- ¹⁹Ellul would not allow his ways of thinking to be called methods because this would involve him in a technique of thinking. See, Wennemann, "Dialectical," pp. 181-83. It is unfortunate, therefore, that professor Wennemann has chosen to describe Ellul's thought as involving a method.
- ²⁰Wennemann, "Ellul's Dialectical Method," p. 182, quoting Ellul, "Mirror of These Ten Years," in *Christian Century*, February 18, 1970, p. 200.
- ²¹Wennemann, "Ellul's Dialectical Method," p. 183, quoting William H. Vanderburg, ed., *Perspectives on Our Age: Jacques Ellul Speaks on His Life and Works* (New York: Seabury Press, 1981), p. 15. Wennemann's entire note should be used for clarity on Ellul's "two totalities."
- ²²Wennemann, "Ellul's Dialectical Method," p. 185.
- ²³See Clifford G. Christians and Jay M. van Hook, eds., *Jacques Ellul: Interpretive Essays* (Champaign: University of Illinois Press, 1981), p. 296.
- ²⁴Jacques Ellul, *What I Believe*, trans. by Geoffrey W. Bromiley (Grand Rapids, Wm. B. Eerdmans Pub. Comp., 1989), p. 4.
- ²⁵Ellul, *What I Believe*, p. 3.
- ²⁶Ellul, *What I Believe*, p. 4.
- ²⁷Ellul, *What I Believe*, p. 24.
- ²⁸Ellul, *What I Believe*, p. 28.
- ²⁹Ellul, *What I Believe*, p. 33.
- ³⁰Ellul, *What I Believe*, p. 45.
- ³¹Ellul, *What I Believe*, p. 49.
- ³²Jacques Ellul, *The Ethics of Freedom*, trans and ed. by Geoffrey W. Bromiley (Grand Rapids: Wm. B. Eerdmans Pub. Comp., 1976 [French original, 1973]), p. 12.
- ³³Since God is transcendent, She transcends our pronouns. Furthermore, since He includes all people in his care, men and women, girls and boys are to be equally valued and respected. Hence, the pronoun choice is somewhat arbitrary for me.
- ³⁴Ellul, *Ethics of Freedom*, p. 14. Emphasis added.
- ³⁵Ellul, *Ethics of Freedom*, p. 16.
- ³⁶Ellul, *Ethics of Freedom*, p. 16. Recently I travelled to the Netherlands to study and to lecture. While there I spent a delightful evening with noted reformed philosopher of technology Professor Egbert Schuurman. In this personal conversation, he told me that Ellul is now beginning to admit that the "New Jerusalem" may be more evident in history than he has been able to see. In fact, there may be a book from the pen of Ellul on this topic appearing in the not too distant future. Perhaps the Christian half of Ellul is beginning to gain ascendancy in his twilight years?
- ³⁷Ellul, *Ethics of Freedom*, p. 34 ff. and passim.
- ³⁸Ellul, *Ethics of Freedom*, p. 75.
- ³⁹Ellul, *Technological Bluff*, p. xiii.
- ⁴⁰For a thorough, well-documented book on how the Industrial Revolution overran "vulnerable" and "weak" educators, thereby taking control of public education, read Raymond E. Callahan, *Education and the Cult of Efficiency* (Chicago: The University of Chicago Press, 1962).
- ⁴¹Ellul, *Technological Bluff*, p. 15.
- ⁴²For a mainline economist's critique of this optimistic notion of perfect competition and the reality of imperialism read, Douglas C. North, *Institutions, Institutional Change and Economic Performance* (New York: Cambridge University Press, 1990), p. 131 ff., esp pp. 134-35.
- ⁴³Ellul, *Technological Bluff*, p. 21.
- ⁴⁴There are many writers who are pessimistic about technology's place in our lives. Their number seems to grow in the latter half of the twentieth century. My choices in this chapter are only meant to be introductory and illustrative. The experienced reader will want to consult a more thorough listing. See therefore, Professor Egbert Schuurman's notion of the "transcendentalists" or thinkers who see technology as a threat to human freedom in *Technology and the Future: A Philosophical Challenge*, trans. by Herbert D. Morton (Toronto: Wedge Publishing Foundation, 1980), pp. 51-176.
- ⁴⁵Jürgen Habermas, *Technology and Science as "Ideology"* (Frankfurt: Suhrkamp Verlag, 3rd ed., 1969), p. 7.
- ⁴⁶Habermas, *Technology*, p. 53.
- ⁴⁷Habermas, *Technology*, p. 53.
- ⁴⁸Habermas, *Technology*, p. 80 and passim.
- ⁴⁹Habermas, *Technology*, pp. 81 and 96.
- ⁵⁰Habermas, *Technology*, p. 91.
- ⁵¹Habermas, *Technology*, p. 101 ff.
- ⁵²Nicholas Berdyaev, "Man and Machine," in *The Bourgeois Mind and Other Essays* (New York: Sheed and Ward, 1934), pp. 203-204.
- ⁵³Berdyaev, "Man and Machine," p. 204.
- ⁵⁴Berdyaev, "Man and Machine," p. 205.
- ⁵⁵Berdyaev, "Man and Machine," p. 210.
- ⁵⁶Berdyaev, "Man and Machine," p. 212.
- ⁵⁷Berdyaev, "Man and Machine," p. 212.
- ⁵⁸Unfortunately, we have not always recognized that women were accorded the same status as that of men, that being the image of God.
- ⁵⁹Berdyaev, "Man and Machine," p. 206.
- ⁶⁰The television series "Miami Vice" aired in the United States during the 1970s and 1980s. Set in the steamy confines of Miami, Florida, two vice cops — Crocket and Tubbs — fought the sale and distribution of a myriad of illegalities. What set these cops apart from most mortals I know was their exposure to technologically titillating lifestyles. Fast cars, expensive boats, gorgeous homes, mouth-watering food, and lavish sex (itself methodically choreographed) provided a technological milieu that many aspirants would find attractive. In comparison with this attraction, the Zambian moralizing about the evils of capitalism seems quixotic.
- ⁶¹This reference to Descartes is admittedly obscure. Please allow me simply to assert that Descartes' view of the relationship of universal laws to human freedom was one of irresistible cause to human necessity.
- ⁶²Ellul's reformed Protestant tradition is close to that of my own. It is for that reason that I both respect his work and at the same time find it so troublesome.
- ⁶³Ellul, *What I Believe*, p. 1.



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Last Things First: The Impact of Eschatology on Ecology

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As is commonly recognized, evangelical Christians have not traditionally given environmentalism a prominent place on their moral agenda. Numerous reasons for this can be identified. One is that many evangelicals are Americans and Americans in general are only reluctantly recognizing the importance of the environmental crisis.¹ A second reason is that environmentalism has often been associated with the liberal political agenda and with mainline Christians who do not generally identify with the religious and moral interests that chiefly occupy evangelicals.² Since evangelicals predominantly are political and moral conservatives, they have looked with considerable suspicion on environmental activists. As explanatory as the first two reasons may be, I would like to highlight a third and far more pivotal obstacle. This is the fact that evangelicals are predominantly committed to an eschatology³ that makes it religiously unnecessary and logically impossible to engage in the long-range commitments to the environment required by a truly serious attitude of ecological stewardship.

An Eschatology of Despair

Evangelicals, and even more so fundamentalists, (who will not be singled out for special consideration), have generally embraced an eschatology that is fundamentally pessimistic regarding the creation and human history. For them, the creation as we know it figures *discontinuously* rather than *continuously* in God's plans for consummating history and the Kingdom of God. Uniformly within classical and revised dispensationalism, and the popular apoca-

lypticism⁴ such as that which Hal Linsey represents, there is the belief that at the end of the Millennium, after evil's final revolt against God, the creation as we know it will be destroyed by God, and will be replaced by a new heaven and a new Earth absolutely free of sin and evil influences.

The eschatology that currently dominates evangelicalism is known as premillennialism. It is often flavored by the dispensationalism⁵ of John Nelson Darby and his successors (e.g., C.I. Scofield, Lewis Sperry Chafer, Charles Ryrie, etc.). (See note 5 for definitions of premillennialism and dispensationalism.) Major changes in dispensationalism have occurred in the past forty years. Most recently a group of scholars identified as progressive dispensationalists has emerged. By and large, they do not believe that destruction of the creation by God is a part of the divine drama. They hold instead that the whole of God's redemptive plan will be completed in a manner that is *continuous* with this present creation. David L. Turner, for example, says that "the new creation will be none other than the old Adamic universe gloriously liberated from its cacophonous groan to a harmonious song of praise to the One who sits on the throne."⁶ The time may come when this form of dispensationalism will replace the current discontinuous and pessimistic eschatology. However, the progressive dispensationalists are making it more and more difficult to retain "dispensationalism" as a meaningful term.⁷

But it is the older forms of dispensationalism (classical and revised), not progressive dispensationalism, that underwrite the eschatology of most of

present-day evangelicalism. In many instances, a fairly consistent dispensationalist schema is embraced. In many other instances the eschatology of evangelicals is a popular apocalypticism that borrows from dispensationalism without attempting to be consistent with it. Whatever the form, according to the prevailing premillennialist eschatology, this present world is but the temporary stage on which the divine drama is unfolding. No lasting covenant between God and the creation exists. Although the creation is not viewed as inherently evil, the final destruction of evil entails destruction of the world. In the end, despair, not hope, elimination, not redemption, is this world's truth. You can search the primary and secondary literature in vain for any reason or encouragement to take this world as seriously as a sustained and systematic environmental ethic requires.⁸

So long as evangelicals hold to an eschatology that understands the world to exist under a divinely imposed death sentence, we should expect no major change in their disposition toward the environment or the environmental movement. They will continue to interpret environmental problems as among the first fruits of an imminent expression of divine wrath against "the late, great planet Earth."⁹ Invitations to participate in sustained efforts at solving environmental problems will be thought of as futile at best, and as defying God's will at worst.

Evangelicals Have Spoken

There are, of course, many commendable instances of evangelical participation and leadership in efforts to address the environmental crisis. Many consider the publication of Rachel Carson's *Silent Spring* in 1962 to be the beginning of the environmental movement in the western world. Joseph K. Sheldon notes that, although the Christian response to the environmental crisis built slowly, in the same year that Carson published her book, E. Sauer published *The King of the Earth*¹⁰ in which he called Christians to ecological responsibility. In 1970, three years after Lynn White's famous essay,¹¹ Francis Schaeffer published *Pollution and the Death of Man*, probably the most important early response to the environmental crisis by an evangelical.¹² It provided solid theological support for a Christian ecological ethic, and for many evangelicals it gave legitimacy to the growing environmental movement.¹³ In 1971, J. W. Klotz published a book that contrasted God's creation and man's pollution.¹⁴ In 1972 H. H. Barnette published *The Church and the Ecological Crisis*, an important book, written for the general reader.¹⁵ Nu-

merous publications followed. After Lynn White's essay, a growing stream of articles by Christians addressed the crisis (80 or so during 1970).¹⁶ In 1983 the Calvin Center for Christian Scholarship produced a Christian environmentalist manifesto called *Earthkeeping: Christian Stewardship of Natural Resources*.¹⁷ The AuSable Institute for Environmental Studies provides an important support base for evangelicals who want to position themselves at the forefront of environmental ethics. The Institute offers courses, publications and training in environmental ethics for students in Christian colleges. In the summer of 1993 the AuSable Institute, the Oxford Center for Mission Studies, and the World Evangelical Fellowship sponsored a conference in which Christian scholars from the five continents examined the same issues addressed by the 1992 Earth Summit. A World Evangelical Network was formed to encourage evangelicals worldwide to think about their care for creation in light of biblical and theological reflection.¹⁸ Additional significant illustrations of a growing evangelical presence in the environmental movement can be cited.¹⁹

A Tenacious Obstacle

As noteworthy as recent signs in evangelicalism might be, they do not represent most evangelicals. "The environmental movement," says Loren Wilkinson, "divides and confuses Christians, keeping us at arms length from a crucial arena of social engagement."²⁰ Lying beneath the failure by evangelicals on a broad scale to apply their moral, economic and political energy to the environmental crisis, there is a deep-seated despair about the future of the creation as we know it, a despair which many evangelicals have come to perceive as essential to the Christian faith. This despair arises from theological convictions that are incompatible with a sustained concern for the environment. They also militate against the Bible's call to stewardship. Canadian theologian Douglas John Hall observes that Christians have contributed to the "manifold crisis of our planetary environment" just as surely through what they believe as through what they have done.²¹

It is surprising to many that the current domination of evangelicalism by premillennialist eschatology and popular apocalypticism has not always been the case. In the United States prior to the Civil War, evangelicals led in efforts at social reform, including the abolition of slavery and the temperance movement.²² But by the end of the Civil War evangelicals had begun to give up the idea that they should seek to change the world. Evangelicalism

began to adopt a discontinuous eschatology characterized by historical pessimism and a "corrosive fatalism."²³ And so began the "Babylonian captivity" of American evangelicalism, a captivity which has not yet ended.

According to church historian Richard Lovelace, the premillennialism of John Nelson Darby probably came to dominance through the influence of D. L. Moody, who abandoned the post-millennial optimism of the latter 19th century American evangelical stream, and embraced dispensationalism, and with it, pessimism regarding this world.²⁴ Lovelace and others who recognize the impact of dispensationalist premillennialism on evangelicalism also recognize that its influence is not monolithic; not all American evangelicals adopted the dispensationalist valuation of the Earth.²⁵ Nevertheless, it is hard to deny, Lovelace maintains, that the domination of evangelicalism by dispensationalist premillennialism "often dampens zeal for reform and revival, especially in the area of social renewal."²⁶ As a corollary, evangelicals have at a primordial level come to view redemption as salvation *out of* a doomed creation. Belief that the redemptive work of the Second Adam finally excludes this present world seems not to raise any major doctrinal problems for most evangelicals. Usually in dispensationalism, God's sentence of death on the creation is followed by hope for a new creation, but (with the exception of progressive dispensationalism) only after God has destroyed the present creation as we know it.

Despair regarding this creation ranges from the more serious works of dispensationalists such as C.I. Scofield, Lewis Sperry Chafer, John F. Walvoord and J. Dwight Pentecost, the almost celebrative pessimism of Hal Lindsey,²⁷ David Wilkerson²⁸ and Jerry Falwell, to the strange mixture of environmentalism and apocalyptic eschatology found in William B. Radke.²⁹ Radke on the one hand urges Christians to look forward with expectancy "to the day when we will leave this planet and be transported to a far more glorious heavenly existence."³⁰ On the other hand he believes that the Bible mandates systematic care for the creation. God intends that Christians be committed to "solving the plight of the Earth,"³¹ in spite of the fact that one day God will "uncreate all that he has made."³²

These two extremes show how wide-ranging the premillennial and dispensational postures toward the world can be. Nevertheless, both positions finally immobilize Christians with regard to the plight of the Earth and its environment. Radke's protest to the contrary notwithstanding, it is logically impossible and morally contradictory both to embrace this

creation as inviolable and at the same time reject it as hopelessly doomed and excluded from God's future. Even the temporary environmentalism called for by Radke makes impossible the long-range plans and commitments which adequate care for the creation demands. Until evangelicals purge from their vision of the Christian faith the wine of pessimistic dispensationalist premillennialism, the Judeo-Christian doctrine of creation and the biblical image of stewardship will be orphans in their midst. These doctrines will be unable to yield their rich potential for environmental ethics.

What I have referred to as the "Babylonian captivity" of evangelicalism cannot end until a compelling alternative is identified and embraced. Such an alternative will have to embody evangelical convictions regarding the sovereign lordship of Jesus Christ, the authority of the scriptures and the Christian hope for the consummation of the Kingdom of God which was inaugurated in the first advent of Christ. Evangelicals will have to be shown from the scriptures that it is essential to the Christian hope that there are compelling Christian reasons for "the Earth to rejoice."³³

Reconciling Eschatology and Ecology

Currently in evangelicalism a movement is underway to provide just such an alternative. Evangelical theologians are recovering themes that celebrate the gospel as good news for all creation rather than as a salvaged escape from a creation under capital sentence.³⁴ An increasing number of theologians who proceed from identifiable evangelical convictions are offering a vision of redemption that transcends the premillennialist and dispensationalist paradigm. Let us look at some of the new departures now being taken.

The ax has been most directly laid at the root of discontinuous eschatology by Robert Jewett.³⁵ Jewett uses seven key sayings of Jesus to show convincingly that the strongest New Testament opponent of apocalypticism was Jesus himself. Jesus steadfastly opposed the end-of-time apocalyptists of his day by repeatedly showing the folly of apocalyptic solutions. Those who embraced apocalypticism failed both to comprehend and apprehend the kingdom of God. He observed the monotonous collapse of apocalyptic schemes after they had brought disaster to those who supported them. Jewett warns that "...sincere believers continue to be led to reject the essential message of the Lord they profess to serve by chasing apocalyptic schemes Jesus himself rejected."³⁶ Jewett calls attention to the contradiction

between the violence and vengeance associated with apocalypticism, and the peaceable kingdom Jesus inaugurated. Jesus separated "the nationalistic idea of revenge from the hope of redemption."³⁷ The Son of God broke the cycle of violence. He disappointed those who loved vengeance and who hoped that the kingdom of God would "pass the blow on."³⁸

William Dyrness has, like Jewett, gone to the scriptures, especially the New Testament, to find a way out of the dispensationalist wasteland. With eyes and ears tuned to learn the role of this creation in God's future, Dyrness concludes that the Earth — this creation — has good reason to rejoice. He rejects apocalyptic eschatology because, according to the scriptures, the creation "always remains open to [God]."³⁹

A disruption of the present creation in order to establish God's righteous rule on Earth is utterly unnecessary. Whatever the consummation of the kingdom proves to be, it will grow out of the current creation God has called good. Such an affirmation, Dyrness believes, is consistent with the New Testament's promise that a complete and final judgement of sin and human history will occur. But the destruction associated with the kingdom's consummation is a destruction of sin and Satan—those things that threaten creation—not a destruction of the creation itself.⁴⁰ The consummation of God's kingdom, Dyrness maintains, will be a "sublime showcase" of the creation's goodness which has never been renounced by God.⁴¹ He agrees with G. R. Beasley-Murray, who maintains that not a line of Revelation's description of the city of God is incapable of realization within history, even though its perfect expression requires the transcendent order, as John makes plain.⁴²

One of the most compelling attempts to join the meaning of Christian mission and stewardship with care for the creation is being made by theologian Douglas John Hall. For those who will listen, he traces a dependable path out of the dispensationalist wilderness. Hall urges us to realize that "unless the fate of the world does matter to Christians, and in a fundamental way, it is futile to expect [them] to occupy themselves over much with the understanding, nurture, and preservation of non-human species and of the Earth itself."⁴³ God's love and the gospel to which it gives birth

"is applicable in a very concrete sense, and with all of its intensity and mystery to Earth. Even ... the Apocalypse of St. John makes the renewing of [the] Earth the object of ... divine ... love Judgement is for ... cleansing ... the world, not its demolition."⁴⁴

Hall argues forcefully that Christians cannot turn away from this world without turning away from something essential to the gospel. He says that one of the most urgent tasks confronting the church is to learn how to present the gospel and Christian life in *this*-worldly terms while still remaining faithful to the *core* of the Christian tradition.⁴⁵ True, with regard to the future of the creation there is an ambiguity in the New Testament. The apostle Paul can be read in a manner that leaves us with either an "ecological" interpretation of the gospel (esp. Rom. 8: 22-23), or as providing warrant for an other-world spirituality. The latter reading seems to rule out Paul's vision of Christians as standing in solidarity with the whole creation. Hall thinks that the ambiguity serves to warn us that Christian faith is more than worldliness, and it warns us to "maintain a dialectical attitude to the world."⁴⁶

The warning having been registered, Christians should also realize that the church is at a decisive crossroads in the Christian pilgrimage through history. Either we shall choose to embrace the life of this world, or we shall have chosen, "or been chosen by," death.⁴⁷ The discontinuous eschatology that dominates evangelicalism teaches otherwise; it says that we can renounce the world and still choose life. But Hall believes that the gospel of Christ properly understood compels us to disagree, to recognize that a rudimentary indicative concerning this world is included in the gospel, viz., that the world "is greatly loved and that its mending is an immediate and vital dimension of the whole work of God."⁴⁸

The final representative voice now calling for a rescue of evangelicalism from pessimistic eschatology is more influential among evangelical scholars than the others we have examined. In *Tracking the Maze*, Clark Pinnock, another Canadian, outlines the changes in thought that have emerged from his re-examination of essential evangelical commitments, and condemns the fruitless conflicts that have gone on between mainline and evangelical Christians. He identifies nine major changes now occurring in evangelical theology, changes he apparently embraces. One such change is "a definite shift away from pessimistic premillennialism to a positive outlook, to the belief that Christ can transform culture" Says he, "We are seeing the rise of an evangelical social gospel, a liberation theology."⁴⁹

* * * * *

Theologians and scientists who are evangelicals should join hands to help lead evangelical Christianity out of its bondage to an errant eschatology.⁵⁰ Dispensationalist premillennialism defrauds the

creation of the gospel's promise that it too "will be delivered from the bondage of corruption into the glorious liberty of the glory of the Children of God" (Rom. 8:21, NRSV). It also cripples the witness of evangelical faith in the world.

Both scientists and theologians have access to resources unique to our respective realms of expertise that can, in the words of David Lowes Watson, announce the good news that "God does not foreclose on the creation."⁵¹ By employing the voices of the natural order⁵² and theology, we should join forces to show that the gospel is good news for this creation even as it is good news for all people. ☉

Notes

¹This reason is given by David Mahan as quoted in *Christianity Today*, vol. 34, no. 7, April 23, 1990, 38. Douglas John Hall defines the current environmental crisis as "the rapid deterioration of our natural environment under the impact of a rampant technological society..." Douglas John Hall, *Imaging God: Dominion as Stewardship* (Grand Rapids: Wm. B. Eerdmans Publishing Company, 1986), vii.

²Dean Ohlman, President of the Fullerton, California based Christian Nature Federation (CNF), as quoted in "Christianity and Ecology: A Better Mix Than Before," *Christianity Today*, Vol. 34, No. 7, April 23, 1990, 38.

³Eschatology is "the doctrine of last things," or the doctrine of the consummation of the kingdom of God inaugurated in the person and work of Jesus Christ. The word is derived from two Greek words, *eschatos* ("last" or "last things") and *logos* (in this instance, "knowledge").

⁴This phrase is borrowed from Craig Blaising, coeditor of *Dispensationalism, Israel and the Church: The Search for Definition* (Grand Rapids: Zondervan Publishing House, 1992).

⁵According to Ernest Sandeen, premillennialism is "the hope of the imminent return of Christ, robed now in power and majesty, whose coming will signal the final and complete defeat of the enemy and inaugurate a peaceful kingdom that will last a thousand years" after which will come the final consummation (the "millennium" is mentioned only in Rev. 20:1-10). Ernest R. Sandeen, *The Roots of Fundamentalism: British and American Millennialism: 1800-1930* (Chicago: The University of Chicago Press, 1970), 4. As the *Beacon Dictionary of Theology* puts it:

Dispensationalist premillennialism arose in the early 19th century largely through the influence of J.N. Darby and the Plymouth Brethren. It forms the substance and structure of the *Scofield Reference Bible* (1909), whose subtle but powerful influence is largely responsible for its popularization in evangelical circles. Distinctive of the view is: (1) the division of history into dispensations or eras (usually seven); (2) the division of the Second Coming into two events, the secret Rapture and the public revelation, normally separated by seven years, during which time the Earth experiences the Great Tribulation and raptured saints celebrate the marriage supper of the Lamb in heaven; (3) the division of the elect into two bodies: the (Gentile) Church, saved by faith, and Jews, saved during the millennium by divine fiat; and (4) a literalistic interpretation of prophecy.

George Lyons, "Premillennialism," *Beacon Dictionary of Theology* (Kansas City: Beacon Hill Press, 1983), 414.

Premillennialism is marked by the idea that society cannot be reformed in any real sense before the return of Christ. But pre-millennialists are not in agreement over what Christians

should do *in* and *for* society as they await the second advent. Some premillennialists condemn all reform efforts while others believe that until Christ returns Christians should engage in certain kinds of reforms and should do whatever is possible to slow down the decline.

What has been said so far about dispensationalism applies to classical dispensationalism and with qualification to revised dispensationalism. Progressive dispensationalism introduces major revisions of dispensationalist doctrine, so much so that one must read progressive dispensationalism over against the two earlier forms. Craig A. Blaising, one of the major representatives of progressive dispensationalism, answers the question, "What is dispensationalism?" in the following terms:

I have come to see dispensationalism as a tradition of biblical interpretation which has undergone various modifications through its less than 200 year history. Certain themes and emphases give continuity to this tradition, such as an emphasis on the authority of Scripture and the practicality of its exposition for personal and corporate edification. Other emphases include a belief in the relevance of biblical prophecy and apocalyptic for theological work today and an appreciation of diversity in biblical theology as it relates to the history of revelation. These emphases have led dispensationalists to explore the significance of the church as a new manifestation of grace in redemption history and to affirm a future for national, political Israel.

Craig A. Blaising, "Changing Patterns in American Dispensational Theology," (an unpublished paper presented to the 1993 meeting of the Wesleyan Theological Society, Southern Nazarene University, Bethany, Oklahoma, November 5-6, 1993). See also Craig A. Blaising, *Progressive Dispensationalism* (Wheaton, Ill.: Victor Books, 1993).

⁶David L. Turner, "The New Jerusalem in Revelation 21:1-22:5: Consummation of a Biblical Continuum," *Dispensationalism, Israel and the Church*, 265.

⁷See Robert L. Saucy, *The Case for Progressive Dispensationalism: The Interface Between Dispensationalism and Non-dispensational Theology* (Grand Rapids: Zondervan Publishing House, 1993), 8.

⁸In *Addresses on Prophecy* (Swengal, Pa.: Bible Truth Depot, 1910), C.I. Scofield, a principal representative of classical dispensationalism and editor of the *Scofield Reference Bible* (1909 and 1917), says that when God destroys this world "its long, strange and tragic drama" will have ended (p. 119).

Lewis Sperry Chafer, founder of Dallas Theological Seminary (1924), and editor of *Bibliotheca Sacra* (1940-1952), was the major systematic theologian of dispensationalism. He is identified with classical dispensationalism. In his *Systematic Theology*, Vol. V, Ch. XIV, "The Eternal Kingdom of Christ Incarnate," Chafer discusses the future of the Earth. His position is characteristic of classical dispensationalism (1900-1950), revised dispensationalism (1950-1970), and contemporary popular apocalypticism. According to Chafer, for a period of time after the millennium, a final demonstration of evil will occur on Earth. Satan will be released. An astounding revolt against God will occur. After the program of evil has been fully expressed, "the present heaven and the present Earth [will] pass away and disappear forever. . . . This is God's universe. It is planned and executed, and will be consummated to answer reasons which are within His infinite Being (Mt. 24:35; Heb. 1:10-12; 2 Pet. 3:7, 10-12; Rev. 20:11)," Lewis Sperry Chafer, *Systematic Theology: Christology*, Vol V, (Dallas, Texas: Dallas Seminary Press, 1948), 362.

Afterwards, Chafer says, God will repeat his mighty creative act by creating a new heaven and a new Earth. The new creation will be so unlike the old, and so exalted above it, that "the former creation will not be brought to mind" (*Ibid.*, 365).

In all of Chafer's soteriology, nothing is said about this creation being included in salvation. Given the Earth's future,

the situation could not be otherwise (Chafer, Vol III, *Soteriology*).

In *Will Man Survive?*, J. Dwight Pentecost, a major representative of revised dispensationalism, discussed what he believed to be the major problems confronting humankind. Problems such as war, lawlessness, injustice, ignorance, sickness, disease, and so forth are identified. But concern for the creation is not mentioned. Admittedly, this would have been early in the emergence of environmental awareness. J. Dwight Pentecost, *Will Man Survive?: Prophecy You Can Understand* (Chicago: Moody Press, 1971), 178-189.

John F. Walvoord, another significant representative of revised dispensationalism, said that the Scriptures clearly state the destruction of the old heaven and the old Earth (2 Pet. 3:10,12). "In view of the tremendous energy locked into every material atom, the same God who locked in this energy can unlock it and destroy it, reducing it to nothing." "Since the power of God that locked in atomic power can also unlock it, it is possible that the destruction of the physical Earth and heaven will be a gigantic explosion in which all goes back to nothing. Out of this God could create a new heaven and a new Earth as a base for eternity. In any case, the new Earth will be totally different from the old Earth..." John F. Walvoord, *Major Bible Prophecies: 37 Crucial Prophecies that Affect You Today* (Grand Rapids: Zondervan Publishing House, 1991), 414.

The same dismal prospects for the Earth are found in C. Leslie Miller: Satan and man will have destroyed God's Earth "until it is no longer fit for habitation." So, God will destroy it and create a new Earth (*Goodbye World*, Glendale, Ca.: G/L Publications, 1972), 131.

In a *Handbook of Biblical Prophecy*, edited by Carl Armerding and W. Ward Gasque, James Robert Ross gives instructions to premillennialists regarding how to live "between two ages." He urges Christians to become politically and socially engaged. Vital Christianity, he says, does not motivate one to withdraw from the world as though it were a sinking ship. But when we look for a reason to make commitments to the world, Ross provides nothing. Instead, we are warned not to forget "the judgment that stands over the world" (Grand Rapids: Baker Book House, 1977), 239.

In Hal Lindsey, the best known contemporary representative of popular apocalypticism, the pattern we have seen so far does not change, except that he treats the eventual destruction of the world as an event to celebrate. Christians, he says, look forward to "the ultimate trip" when they will be "snatched away" to be with Jesus in heaven (p. 137). After the millennium, Satan will be released momentarily. Then God will crush the last rebellion, "there will be no more human history." Lindsey thinks that 2 Peter 3:10-13 predicts cosmic nuclear destruction: Christ will loose "the atoms of the galaxy in which we live. No wonder there will be a great roar and intense fire." Then comes the new creation: "Christ will put the atoms back together to form a new heaven and a new Earth, in which only glorified persons without their sinful natures will live" (p. 179). The "new Earth," not this one which is sentenced to death, is the one Lindsey loves and wants to inhabit: "There will be no more rebellion of man's will against God; only righteousness, peace, security, harmony and joy. That's where we want to be." Hal Lindsey, *The Late Great Planet Earth*, (Grand Rapids: Zondervan Publishing House, 1970), 179.

⁹Loren Wilkinson, "How Christian is the Green Agenda?" *Christianity Today*, Vol. 37, No. 1, January 11, 1993, 20.

¹⁰E. Sauer, *The King of the Earth* (Grand Rapids: Wm. B. Eerdmans Publishing Co), 1962, 9.

¹¹"The Historic Roots of our Ecological Crisis." Lynn White called Christianity "The most anthropocentric religion the world has ever seen." Because of its belief in human dominion, the desecralizing of nature and its belief that ultimate human destiny lies with God rather than with the Earth, Christianity has encouraged a destructive exploitation of the world. White's

article was published in *Science*, Vol. 155, No. 3767, March 10, 1967, 1203-1207. See the rebuttal by Ernest S. Feenstra, "Christian Impact on Ecology," *Science*, Vol. 156, No. 3776, May 12, 1967, 737.

¹²Francis Schaeffer, *Pollution and the Death of Man: The Christian View of Ecology* (Wheaton, Ill.: Tyndale House Publishers, 1970).

¹³Joseph K. Sheldon, *Rediscovery of Creation: A Bibliographical Study of the Church's Response to the Environmental Crisis* (Metuchen, N.J.: Scarecrow Press, 1992), 29. This is the most comprehensive bibliographical study of the church's response to the environmental crisis.

¹⁴J.W. Klotz, *Ecological Crisis: God's Creation and Man's Pollution* (St. Louis: Concordia Publishing House, 1971).

¹⁵H.H. Barnett, *The Church and the Ecological Crisis* (Grand Rapids: Eerdmans Publishing House, 1972).

¹⁶Sheldon, 26-27.

¹⁷Loren Wilkinson, ed., *Earthkeeping: Christian Stewardship of Natural Resources* (Grand Rapids: Eerdmans Publishing Company, 1980), revised as *Earthkeeping in the 90's: Stewardship and the Renewal of Creation* (Grand Rapids: Eerdmans Publishing Company, 1991).

¹⁸Loren Wilkinson, "How Christian is the Green Agenda?," 19. In 1988 the AuSable Institute sponsored a conference with the theme, "Peace, Justice, and the Integrity of the Creation." Calvin DeWitt, head of the AuSable Institute, says that Christians have become increasingly aware that the environmental crisis is of direct importance to them (quoted in *Christianity Today*, Vol. 33, No. 13, September 22, 1989, 38).

¹⁹*Ibid.*, 18-19. One additional sign is the Land-Stewardship Project headed by Ronald Kroese. Kroese's organization works with churches and other groups to promote farming methods that preserve the environment (*Christianity Today*, Vol. 33, No. 13, September 22, 1989). See Anthony Campolo, *How to Rescue the Earth Without Worshipping Nature*, Nashville: T. Nelson Publishers, 1992.

²⁰*Ibid.*, 16.

²¹Douglas John Hall, *Imaging God*, 24.

²²Timothy L. Smith, *Revivalism and Social Reform: American Protestantism on the Eve of the Civil War* (Gloucester, Massachusetts: Peter Smith, 1957).

²³Tom Sine, "Bringing Down the Final Curtain," *Sojourners*, Vol. 13, No. 6, June-July 1984, 11.

²⁴Richard Lovelace, *Dynamics of Spiritual Life* (Downer's Grove, IL: Inter-Varsity Press, 1979), 410.

²⁵Charles and Archibald Hodge, William G. Shedd, A.H. Strong, and B.B. Warfield.

²⁶Lovelace, *Dynamics of Spiritual Life*, 411.

²⁷Hal Lindsey, *The Late Great Planet Earth* (Grand Rapids: Zondervan Publishing Company, 1970); *Satan is Alive and Well on the Planet Earth* (Grand Rapids: Zondervan Publishing Company, 1972); *The Terminal Generation* (Old Tappan, N. J.: Revell, 1976). See Paul Boyer, *When Time Shall Be No More: Prophecy Belief in Modern American Culture* (Cambridge, MA: Harvard University Press, 1992).

²⁸David Wilkerson, *The Vision* (Old Tappan, N.J.: Fleming Revell Press, 1973); *Racing Toward Judgment* (Lindale, TX.: David Wilkerson Youth Crusades, 1976).

²⁹William B. Radke, *Project Earth: Preserving the World God Created* (Portland, OR: Multnomah Press, 1991). Radke is associate professor of Bible and Theology at Northwest Baptist Theological College and Seminary, Langley, B.C.

³⁰*Ibid.*, 13.

³¹*Ibid.*, 30.

³²*Ibid.*, 85.

³³William A. Dymess, *Let The Earth Rejoice: A Biblical Theology of Wholistic Mission* (Westchester, IL: Crossways Books, 1983).

³⁴Wilkinson, "How Christian is The Green Agenda?," 20. (Cf. note #18.)

³⁵Robert Jewett, *Jesus Against The Rapture* (Philadelphia: The Westminster Press, 1979). See also Tom Sine, "Bringing Down the Final Curtain," *Sojourners*, Vol. 13, No. 6, June/July, 1984, 14.

³⁶Ibid., 12.

³⁷Ibid., 55, Jewett is quoting Joachim Jeremias.

³⁸Ibid., 138.

³⁹Dyrness, *Let the Earth Rejoice*, 25.

⁴⁰Ibid., 180ff.

⁴¹Ibid., 23.

⁴²Ibid., 132; Beasley-Murray's statement is taken from "How Christian is the Book of Revelation?" *Reconciliation and Hope: New Testament Essays on Atonement and Eschatology* (Grand Rapids: Wm. B. Eerdmans Pub. Co., 1975, R. Banks, ed.), 281. According to Dyrness, "Continuity is confirmed by the fact that twice John mentions that all the glory of the nations will be brought into the New Jerusalem" (Revelation 21:24,26).

⁴³Douglas John Hall, *Imaging God*, 1986, 26.

⁴⁴Douglas John Hall, *The Stewardship of Life and the Kingdom of Death* (Grand Rapids: Wm. B. Eerdmans Pub. Co., 1988), 54-55.

⁴⁵Ibid., 104.

⁴⁶John Macquarrie, *Principles of Christian Theology*, as quoted by Hall, *Imaging God*, 36.

⁴⁷Hall, *Imaging God*, 40.

⁴⁸Ibid.

⁴⁹Clark H. Pinnock, *Tracking The Maze: Finding Our Way Through Modern Theology From An Evangelical Perspective* (New York: Harper and Row, 1990), 68.

⁵⁰James Huchingson, *Religion and the Natural Sciences: The Range of Engagement* (Harcourt and Brace, 1993).

⁵¹David Lowes Watson, *God Does Not Foreclose: The Universal Promise of Salvation* (Nashville, TN: Abington Press, 1990), 65.

⁵²The recent news from NASA's Cosmic Background Explorer satellite regarding the critical density of the universe is one example.

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A Commentary on *Darwin*

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Adrian Desmond and Jim Moore's *Darwin: The Life of a Tormented Evolutionist* (Warner Books, New York, 1991) is a monumental achievement. And reviewers have not been sparing in their praise. Various descriptions have been "astounding" (by Anthony Burgess in the *Observer*), "exhilarating" (by Melvyn Bragg), "definitive" (by Ruth Rendell), "a riveting tour de force" (in the *Sunday Times*) "majestic" (in the *Independent*), "enthraling" (in the *TLS*), "powerfully evocative" (in the *New Scientist*), and "lavishly informative" (in the *Financial Times*). *Darwin* — I suspect — is forcing its current reviewers to resort to *Roget's Thesaurus* to find fresh phrases through which to express their admiration. In the face of such adjectival exuberance it is frankly hard to know what to say.

Conceived on a grand scale, the book's attention to detail is truly remarkable. Notwithstanding an awesome command of both the Darwin corpus and its secondary literature, it reaches beyond synthesis to persistently challenge standard interpretations. Painstaking interrogation of historical sources is concealed beneath the tangy richness of a style that carries the narrative along with seeming effortless-ness.

Here is thick description of such an order that it seems to engage not only our visual and auditory senses, but our olfactory and tactile ones as well: in *Darwin* we enter a world not just of ideas, but of touch and taste and smell as we travel with the *Beagle* to the sticky tropics, sit with Darwin at the bedside of his dying daughter, peer over his shoulder as he experiments with seeds in salt water, gaze goggle-eyed at the fetid charnel-house Darwin's home becomes as he slaughters pigeons to measure their skeletons, and shiver with him as he takes the ice-cold water-cure douches prescribed by Dr. James Gully. Such details, moreover, are not incidental to the story that Desmond and Moore have to tell, not mere color added to spice up the science; they are intrinsic to the evocation of a flesh-and-blood Dar-

win finally rescued from the Platonic realm of a disengaged history of scientific *ideas*.

Both by virtue of their own hermeneutic skills, and by drawing on the efforts of numerous other recent surveyors, Desmond and Moore have succeeded in substantially redrafting Darwinian cartography. Allow me to mention a few of the newer landmarks that appear on the horizon, and a few older ones that are here brought more sharply into focus.

The originality of the significance they attach to Darwin's early exposure to the seditious science of the Edinburgh radicals at the Plinian society is attested to by the comparative absence of secondary sources for these years compared with the abundance of material for Darwin's later life. The panoramic configurations of the *Beagle* voyage have also been significantly altered by the relative repositioning of a variety of "key" episodes. The Galapagos Islands recede; Tierra del Fuego approaches closer to center stage. The contemporary import of the Galapagos finches is quietly demythologised to a couple of paragraphs, while the wretched Fuegians are shown to have aroused in Darwin heretical suspicions about the dignity of the human species. Such speculations on the links between savagery and civilization — between barbarians and Babbages — amply reveal how central the question of *human* origins was to Darwin's entire project, a view confirmed in Darwin's 1830s reflections on the parallels between racial rivalry and inter-specific struggle. The comfortable territorial boundary between Darwinism and social Darwinism has simply been erased.

Alongside these cognitive insights, Desmond and Moore's account of the *Beagle* voyage confirm that, at this stage, Darwin's *forté* was clearly geology. But in one respect at least he shared the tastes of the zoologists. I mean this quite literally, for zoologists have been known to indulge in some strange gastronomic pleasures. Members of the Zoological So-

ciety, for instance, have demolished such delicacies as zebra, yak and canned rattlesnake, and were in the habit of eating whatever had recently died in the Zoological Gardens. Maybe this is why Darwin literally got his teeth into the species question: on the *Beagle* voyage he variously consumed foetal puma, tortoises, and, embarrassingly, the very first "petise" rhea he encountered.

As for Darwin himself, what we are presented with is anything but the monochrome greybeard who is featured on the book's dustjacket. Instead we encounter a host of different Darwins: the heart-broken father in bereavement; the insecure, homely invalid unnerved outside his ecological niche at Downe, living the double life of an outwardly respectable "squarson" and an inwardly materialistic "devil's chaplain"; the political schemer egging on his X Club devotees to outmaneuver critics, to dispense judgement on traitors to his cause, and to ensure the survival of his survival theory; the tireless experimenter making every conceivable sexual combination to test cross-fertilization in plants or turning his house into a knacker's yard to fix skeletal dimensions; the shrewd speculator who pours tens of thousands of pounds into railway shares and land investments; the champion of hybrid vigor spooked by the close intermarriage and inbreeding in his own family.

No less variegated are the multitude of uses to which Darwin's theories could be put by partisan enthusiasts. Some, like Harriet Martineau, found them subversive of both revealed and natural religion; others, like Charles Kingsley, caught glimpses of a noble conception of divinity lurking beneath the surface; still others, like Marx and Engels, saw English social conditions embedded in the very fabric of his boldest theories. Evolution, it seems, could service everything from democratic radicalism to middle-class capitalism. In all these, and indeed in many other, respects, Desmond and Moore's *Darwin* transcends in scope and scale previous attempts to get the measure of the man and his work.

And yet for all the superlatives that have been harnessed to describe this biography — entirely justified though they are — *Darwin* the book is no more flawless than Darwin the man. Not only are there occasions when we might have wished for more from the authors' collective pen; there are times when it is hard to know precisely what kind of biographical account we are being offered. Allow me to reflect on what to me are three troubling facets of this history: the political reading of Darwin's science, the biographical genre which is deployed to carry the

narrative of Darwin's self, and the nature of the relationships between Darwin, Darwin's science, and Darwinism.

As yet I have deliberately said nothing about the constitutive connections Desmond and Moore draw between Darwin's theorizing and his political life. The early story of evolution — very generally speaking — is located in the maelstrom of the ideological struggles to secure hegemony in British cultural life. The transformist, law-bound, deterministic science of evolution that was imported into Britain from Paris in the 1830s spread like wildfire among those who found themselves marginalized within the scientific establishment and outcasts from the gentlemanly science of the day, and they thus mobilized it in the cause of radical assaults on professional injustice, political expediency, and a hierarchical social order bolstered by priestcraft, providence, and Paleyan natural theology. As a means of challenging the Anglican Tory stranglehold on scientific culture, evolutionary theses, serviced by secular anatomy schools and radical nonconformist colleges, easily gained a foothold in this underworld of scientific "low-life" (to use one of Desmond's expressions).

Seen in these terms, evolution theory became a strategic resource among those striving to wrest power from a traditional Anglican oligarchy whose conceptions of both natural and social hierarchies were bolstered by the doctrine of special creation. But liberal dissenters — Whigs — could countenance certain forms of evolution too. As advocates of social change, industrialization and meritocracy, they too sought liberation from the Anglican ascendancy and could find in a suitably honed evolution theory a sense of inevitable progress that could bolster evolutionary rather than *revolutionary* social change.

It is into this ideological imbroglio that Desmond and Moore launch Darwin's theorizing. It is, of course, a subtle portrait, and one that indeed becomes increasingly nuanced as Darwin perceives how the incorporation of Malthusian principles could facilitate his reaching an emerging middle class public already receptive to a competitive liberalism. All this delicacy of touch is important, for Desmond and Moore are simply too talented as historians to lapse into some crude sociological reductionism. Theirs is no simple determinism which casts Darwin's theory as a mere projection or epiphenomenon of *laissez-faire* economics. Yet, by the same token, it is not always easy to fathom precisely *how* the political and the scientific, the cultural and the natural, are meant to snap together. Winsome writ-

ing and clever correlations can, at once, enlighten ...and obscure.

Let me try to illustrate this by one or two examples. Consider the book's wonderful account of Darwin's fascination over how long seeds could survive in sea water in order to solve the problem of oceanic migration. Having satisfied himself on the issue of germination, Darwin realized that the real problem was not dispersal, but how the immigrant seed could establish itself in the new environment with its own biotic community. So far, so good.

Now, the biographers tell us, the question about the migrant seed is this: "Will it be able to establish a beachhead?" (p. 424). It's that word beachhead I want to stop at. Why was this metaphor chosen? Now maybe Darwin used it himself. If so — fine. But here is a case where I would have liked to hear the word from his own lips. Is Darwin speaking, or is his speech being stage-managed? This is not a trivial point, moreover. For Desmond and Moore immediately go on to tell us that "With the British fleet still battling at Sebastopol it must have seemed curiously topical: as though warfare ran through nature and society, and colonialism was all of a kind." What is going on here? Do we have a telling exposé of a militaristic basis for the migration theory, or is it merely an extremely arresting mode of writing that is used to carry the narrative? After all, the following paragraph proceeds with an update of the Crimean war. Do we find here *constitutive* links between cultural conditions and scientific theory, or just dexterous textual juxtapositioning?

Nor is this an isolated case: we could raise similar questions about the interpolation of periodic political commentary, the connections between cross pollination and Darwin's concerns about his own family inbreeding, or about the links between the division of labor and the economy of life. None of this, to be sure, is intended to deny constitutive connections or replace them with mere constant conjunctions. But it is to argue that what we need here is a sophisticated theory of mediation in which priority is accorded to neither side of the text-context equation. In the absence of some such we are left — perhaps too often — with what seems like an arresting sequence of correlations. Certainly that is preferable to a crass social necessitarianism, but it is surely reasonable to ask for more in a biography that is self-consciously presented as a "defiantly social portrait" that illustrates the "cultural conditioning of knowledge" (p. xx), and that finds intimate connections between theories of matter and political reform much like the seventeenth century feuds between the followers of Newton and Leibniz.

There are other questions about this political reading that might also be asked. Let me mention one. Darwin's early exposure to the freethinking Plinians in Edinburgh is described in some detail. The experience, we are told, "must have" affected the impressionable seventeen year old. The narrative compulsion of this seemingly innocent phraseology invites us to consider the difference between a life as it is *lived*, and a life as it is *told*. Just how politically conscious was Darwin during his Edinburgh years? If he was attuned to the radical challenge of these dissidents, why do we get so little sense of disquiet when he comes within Henslow's orbit in Cambridge? Indeed, in Cambridge and on the *Beagle*, Darwin seems hardly interested in political concerns at all. So what is the significance of the Edinburgh experience? Is it intended to tell us anything about Darwin *at the time*, or is it rather to account for his *later* hesitancy to publish his evolutionary views? At what stage of Darwin's life does the Edinburgh political exposure carry weight?

All of this is a roundabout way of asking what sort of political sociology of scientific knowledge we are confronted with in this biography. Is it a sociology of scientific communication? Surely, yes. The political ethos that Desmond and Moore portray, it seems to me, goes a long way to explaining Darwin's publishing strategy. Fearful for his reputation as a stalwart in the world of wealthy Whiggism, it seems entirely plausible that Darwin withheld advertising his commitment to a doctrine spreading like wildfire among the rabble-rousing, loud-mouthed radicals. Is it a sociology of scientific language? Again, surely yes. We see again and again the imperial, militaristic metaphors in which Darwin's theories were cast. Yet are these metaphors decorative or intrinsic? Do they *constitute* the cognitive claims of the theories, or are they simply rhetorical devices of persuasion — strategies of heuristic communication? We need help, I suggest, to ascertain precisely what explanatory power this sociology of scientific vocabulary possesses. Is it at the same time a sociology of scientific creativity? Here I am less sure. Certainly there are points where Darwin's insights are culturally impregnated — as with his use of Malthusian principles, for example. But whether this is universally the case is more doubtful. There are simply too many occasions when Darwin seems interested — dare I say it — in pure scientific investigation and experimentation. We even encounter him on page 231 suddenly seeing "the light." If this is so, then there is clearly enough slack in the system to allow for the old distinction between the context of scientific discovery, and the context of theory justification. The question I want to ask,

then, is, at base, what kind of sociology of scientific knowledge are we confronted with in *Darwin*?

Let me turn, rather more briefly, to my second concern: the biographical genre. In an interesting investigation of Darwin's reading habits, Gillian Beer noted that during October 1838, the month in which he read Malthus, Darwin also devoured some sixteen other works. "Reading has related these random texts so that they are interactive" she writes. "No one of them is quite the same as if it had been read without the others." She calls this the miscegenation of texts. Now what is true of Darwin is also true of book reviewers. I have, of late, been reading Charles Taylor's *Sources of the Self* and pondering a little on the recent debates about the "construction" of the self. Now biography — like autobiography — is a means of structuring or imposing coherence on the story of a self, and as a literary species it has a history. What it is to write a biography is different from time to time, and perhaps from place to place. For biography comes in a variety of styles. A Freudian, for example, would have written Darwin's biography rather differently. The first eighteen years, that Desmond and Moore dispose of in around twenty pages, would have been far more intensively interrogated. And the years on the *Beagle* voyage would doubtless have centered on his *psychological* transformation from filial-type dependence on Henslow to mature, self-confident theorist.

Desmond and Moore's is, by contrast, a political biography and thus constructs a different Darwinian self than a Freudian might have done. Moreover their strategy is, as John Brooke has put it, "remorselessly sequential." The temporal ordering of the narrative imposes a certain kind of teleology on the subject — to be sure, not a teleology that leads inexorably towards either 1859 or 1871, but a teleology all the same. The question is, just how valuable is this strategy for elucidating Darwin's persona, or better, personae? For as I have said, we encounter here a myriad Darwins — Darwin the invalid, Darwin the experimenter, Darwin the investor, Darwin the dupe of quack medicine, and so on. And, perhaps most significantly of all, a private Darwin and a public Darwin. In different spaces, different Darwins surface. Which should have priority?

Now this is not to parade, still less to adopt, some faddish, deconstructionist trope. Instead I raise the matter because of the significance that Desmond and Moore attach to a series of jottings in the Darwin notebooks and private letters, soliloquies that give a good deal of explanatory bite to their narrative strategy. "Oh, you materialist!"; "It is like confessing a murder"; "What a book a Devil's Chaplain might

write on the clumsy, wasteful, blundering low and horridly cruel works of nature!" These throw-away phrases are seized upon as crucially diagnostic of Darwin's entire project. How much hermeneutic weight should they be permitted to bear? I don't know. But sequential biography implicitly connects these private musings with his public façades into unitary coherence, and raises the question of whether this biographical genre provides the best format for grasping the Darwin phenomenon. Might not a more web-like structure, elucidating the different spaces of Darwin's identities, provide a more useful strategy? Certainly it would subvert the apparently unproblematic privileging of the *private* Darwin over against what is called on at least one occasion his public "mask" (p. 415). Human beings, it might be suggested, have the capacity to rig up diverse models of themselves to suit their politics, their religion, their family, their employers. Asking which is the *real* human self is clearly not the only question we can pose. To prioritize Darwin in one mode is arguably to adopt a particular kind of psychological ontology.

Having reflected on Desmond and Moore's political handling of Darwin's science and their reading of Darwin's identities, it remains for me to ask what bearing these have on Darwinism as an historical entity. *Darwin* the book tells us an awful lot about Darwin the man. How important is this story for understanding the public reception of Darwinism at the time, and indeed since? Suppose, for example, we concede that in Darwin's mind the theory of evolution was inherently materialistic, the work of a Devil's Chaplain, and intimately bound up with Comtean positivism. What are the implications of this for how his text was *read*? Does it mean that somehow Darwinism or evolution theory is essentially materialistic? Surely not. We have already noted how versatile evolution was (and is) as a cultural resource — politically, scientifically, religiously and so on — thereby serving a wide variety of interests.

In the light of these considerations, it might be advisable to give up the idea that Darwinism has any "essential" nature. After all, each and every "definitive" candidate is sure to be contested. Take, for example, Lewontin's claim that the essence of Darwinism lies in its "replacement of a metaphysical view of variations among organisms by a materialistic view." The trouble with this judgment is that it does little historical work for us. For on this reading true Darwinians are as rare as gold dust in the nineteenth century. Certainly it would rule out such key figures as Gray, Lyell, and Wallace, all of whom *thought* of themselves as Darwinians. Moreover, ac-

cording to Robert Richards, virtually the entire tradition of evolutionary psychology in the nineteenth century was constructed by researchers with evident anti-materialist metaphysical commitments. To outlaw them on simple definitional grounds would surely be misguided.

Other candidates have fared little better. The suggestion that the essence of Darwinism lies in his idea of *gradual* species transformation rules out key Darwinians such as T.H. Huxley, who favored a saltationist interpretation. Moreover, contemporary advocates of punctuated equilibria — a conception of evolutionary change that sees organic transformation going in fits and starts — such as Gould and Eldredge, would not pass muster as good Darwinians. Again, restricting Darwinism to a parsimonious interpretation of evolution solely by natural selection faces the embarrassing obstacle that it would rule out Darwin himself, since he also allowed for family selection, use inheritance, sexual selection, correlative variation and so on. Accordingly it is not surprising to find David Hull arguing that there just is no "essence" to Darwinism at all, and that in writing the history of Darwinian theory we would be better off simply looking at those individuals who *considered* themselves Darwinians. This methodology, of course, moves the locus of debate away from narrowly cognitive or conceptual claims towards

broader social factors. Besides, it suggests that the very notion "Darwinism" is a historical entity that is constituted and transformed by the members of the Darwinian circle(s) themselves. All this implies that, however illuminating this biography is of Charles Darwin, Squarson-naturalist, it cannot by its very nature be the last word on what Darwinism *was* or *is*.

That science is a social practice, Desmond and Moore's splendid biography has amply confirmed. It would seem to follow that writing the history of science is likewise a social practice. For if there is no neutral science, neither is there history on a mortuary table. History, like science, becomes destabilized — a resource that can be plundered to serve apologetic interests. Precisely what such a claim commits us to is far from clear. But if it means that all knowledge claims are socially reducible, then the whole project seems caught in a hopeless self-referential dilemma — the old *tu quoque* gambit. Surely this is not the case. To me, the power of Desmond and Moore's sociological reading lies precisely in the better handle that it gets on Darwin's life and times than previous sketches, the truer story that it has to tell about the scientific past. At least I hope so. For otherwise history becomes *our* story, biography becomes autobiography — a mirror, neither of the subject nor the setting, but of ourselves.

Books Received and Available for Review

Please contact the book review editor if you would like to review one of these books. Please choose alternate selections. Write to: Richard Ruble, Book Review Editor, *Perspectives on Science and Christian Faith*, 212 Western Hills Drive, Siloam Springs, AR 72761.

- Marcia Bartusiak, *Through A Universe Darkly: A Cosmic Tale of Ancient Ethers, Dark Matter, and the Fate of the Universe*, Harper Collins, 1993
 Daniel Bjork, *B. F. Skinner: A Life*, Basic Books, 1993
 Rodger W. Bybee, *Reforming Science Education: Social Perspectives and Personal Reflections*, Teachers College Press, 1993
 Kelly James Clark, (ed.), *Philosophers Who Believe: The Spiritual Journey of Eleven Leading Thinkers*, IVP, 1993
 John A. Creager, *Theodynamics: NeoChristian Perspectives for the Modern World*, University Press of America, 1994
 David W. Deamer & Gail R. Fleischaker, *Origins of Life: The Central Concepts*, Jones and Bartlett, 1994
 Ronald L. Ecker, *The Evolutionary Tales*, Northbridge, 1993
 Ivan Ekeland, *The Broken Dice and Other Mathematical Tales of Chance*, Chicago University Press, 1993

- Lonni Erickson, *Creation vs. Evolution: A Comparison*, 1993 edition
 David Feldman, *How Does Aspirin Find A Headache*, Harper, 1993
 S. D. Gaede, *When Tolerance Is No Virtue: Political Correctness, Multiculturalism, and the Future of Truth and Justice*, IVP, 1993
 Martin Gardner, (ed.), *Great Essays in Science*, Prometheus, 1994
 Langdon Gilkey, *Nature, Reality, and the Sacred: The Nexus of Science and Religion*, Fortress, 1993
 Garden Hardin, *Living Within Limits: Ecology, Economics, and Population Taboos*, Oxford, 1993
 David J. Hess, *Science in the New Age*, University of Wisconsin Press, 1993
 Philip Kitcher, *The Advancement of Science: Science Without Legend, Objectivity Without Illusions*, Oxford, 1993
 Murdo William McRae, (ed.), *The Literature of Science: Perspectives on Popular Science Writing*, Georgia University Press, 1993
 Jagdish Mehra, *The Beat of a Different Drum: The Life and Science of Richard Feynman*, Oxford, 1994
 H. Morris, *Biblical Creationism*, Baker, 1993
 Roger G. Newton, *What Makes Nature Tick?*, Harvard University Press, 1993
 Dennis Overbye, *Lonely Heart of the Cosmos: The Story of the Scientific Quest for the Secret of the Universe*, HarperCollins, 1991

Distorting for Darwinism: *NSTA Reports!* Reviews ASA's *Teaching Science*

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In September 1993, ASA mailed its most recently revised version of *Teaching Science in a Climate of Controversy* to over 3,000 high school biology teachers in California. The creation/evolution pseudo-controversy has continued to flare up there, and has been highly visible most recently in the 22,000-student Vista School District. *Teaching Science* is designed to help teachers on the front lines eliminate both creationism and evolutionism from their classrooms by teaching evolution as science. The book suggests ways to correct deficiencies in existing biology texts by providing teachers with examples of unsolved problems and unanswered questions. In addition, the 1993 version includes a ready-to-use critical thinking skills exercise to give students hands-on experience in distinguishing inference from evidence.

The National Science Teachers Association (NSTA) is an "organization of science education professionals and has as its purpose the stimulation, improvement, and coordination of science teaching and learning." NSTA publishes *NSTA Reports!* six times a year to bring science education news and information to its nearly 50,000 members. The October/November 1993 edition contained a review of *Teaching Science* written by Russell Aiuto, director of research and development of NSTA's *Scope, Sequence, and Coordination of Secondary School Science* (SS&C) project.¹ Headlined "Book Claims Fairness, Tries to Dismantle Evolution," Aiuto's review is a unfortunate example of the tactics some advocates of Darwinism use to defend their ideology: *ad hominem* rhetoric, erroneous statements, and misrepresentation of scientific evidence.

The first tactic is illustrated by the headline, reinforced by *NSTA Reports!* Editor Ann Wild's pronouncement in her introduction that "high school biology teachers are the latest targets in the effort to discredit the teaching of the scientific theory of evolution." She then asserts that "Russell Aiuto takes a careful look at the book and at the clever and subtle tactics of those whom he terms 'neocreation-

ists.'" Aiuto, calling the authors of *Teaching Science* "opponents of evolution" who present a "high level of argument," one that is "seductive, seemingly innocent, and ostensibly rational," claims that the book says that we can "save our children from godless Darwinism and finally insinuate creationism into the curriculum." *Teaching Science* is also characterized as "very clever nonsense," and "positively smarmy," while both the book and its sponsoring organization (ASA) are "insidious."

The second tactic is illustrated by a rhetorical maneuver so classic that it could be used as an exam question in critical thinking. Consider the following:

But wait! This book "urges teachers to insist on strictly scientific definitions and to emphasize the differences between evidence and inference." Hmm. What one finds are some "classroom exercises" toward the back of the book which "help" students understand that fossils provide "evolutionary inference," and not "evidence." Perhaps the photograph in a recent issue of *Education Week* of a citizen of Vista, California, holding up a fossil and declaring that it looked old because God made it look old is an example of the distinction between inference and evidence (p. 3).

Most readers will recognize the "red herring" maneuver of the switch to a photo in *Education Week* that has nothing whatsoever to do with *Teaching Science* or ASA. What readers may not be aware of is that Aiuto's statement that our classroom exercises "'help' students understand that fossils provide evolutionary 'inference,' and not 'evidence,'" is totally false. Compare Aiuto's statement with the direct quotation from the relevant section in *Teaching Science*:

Distinguish clearly between evidence and inference. On The Hard Facts Wall, the fossils and their ages constitute evidence of life's history. The lines connecting the taxa, implying common ancestry, are examples of inference (p. 61).

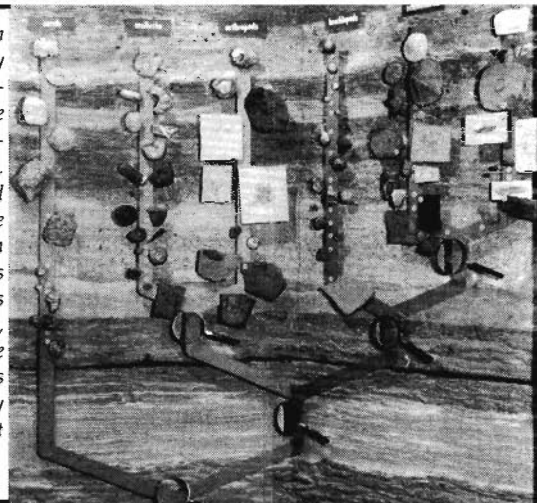
The book thus clearly states that the fossils constitute evidence, whereas it is the lines connecting the fossils

to points of hypothetical common ancestry that are inference. The reason for this is that there are no fossils beneath the magnifying glasses at the points of common ancestry.

To illustrate the review's distortion of science, it will be necessary first to describe the Hard Facts Wall critical thinking skills exercise which appears in the 1993 edition of *Teaching Science*. The primary purpose of the critical thinking skills exercise is to teach students the difference between evidence and inference through a hands-on laboratory exercise. Students are given small cards with names, sketches, and dates of fossils on them. Their assignment is to plot these cards on a geologic time scale graph by date, in the appropriate categories. Their results should look like the diagram below at left, titled "Empirical Presentation of Evidence" (p. 59, *Teaching Science*). The students then compare their work to the diagram below at right, titled "Evidence as Presented by the California Academy of Sciences" (p. 58, *Teaching Science*).

It should be noted that the California Academy of Sciences' presentation is a diagrammatic representation of the Hard Facts Wall, part of their museum exhibit "Life Through Time: The Evidence For Evolution." (See photo above.) Dots in the diagram represent the museum's fossils. The museum places

The Hard Facts Wall, a display in the exhibit "Life Through Time: The Evidence for Evolution," California Academy of Sciences, Golden Gate Park, San Francisco. This particular display does not include a time scale; relative time is represented by horizontal sedimentary layers forming a backdrop against which the fossils are mounted. Individual fossils in each vertical column are identified by numbers keyed to a wall chart at left, giving the species name, the general location where the specimen was found, and its geological age. In some other displays in the Life Through Time exhibit, magnifying glasses are mounted over tiny fossils; on The Hard Facts Wall, the magnifying glasses have no fossils beneath them. (The bent shape of the backdrop, neutral tones of the fossils and background, and glass pane in front of the display make it difficult to get a good photograph. This attempt was made in 1991.)



its fossil dates on a key chart to the left of the fossil display case. The oldest date for each category is shown in the diagrams below so that the reader can follow the errors made in the museum display.

At least two errors appear in the museum presentation. First, younger fossils have been placed below older fossils in the geologic strata, violating the law of superposition. The second error is the connecting of the lines between the categories — where there are *no common ancestors under the magnifying glasses*. Connecting the lines without fossil ancestors shown is not evidence. *It is an inference, with no evidence in the display justifying that inference.* (It should be noted that magnifying glasses are used in other displays throughout the exhibit to magnify small fossils, rather than magnifying empty space, as in this display.)

The empirical presentation (on the left, below) of the "Hard Facts" tells us some useful things about evolution. It tells us there has been "Life Through

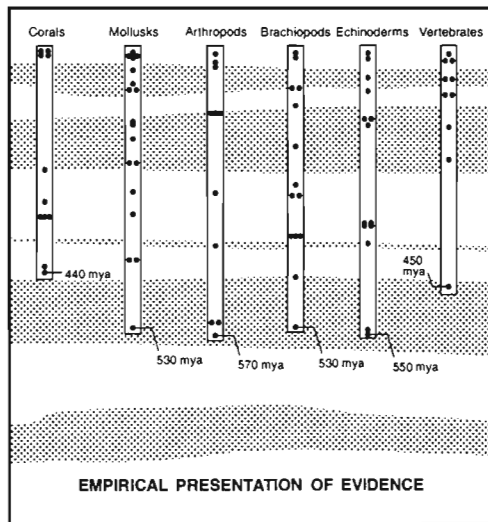


Figure 1

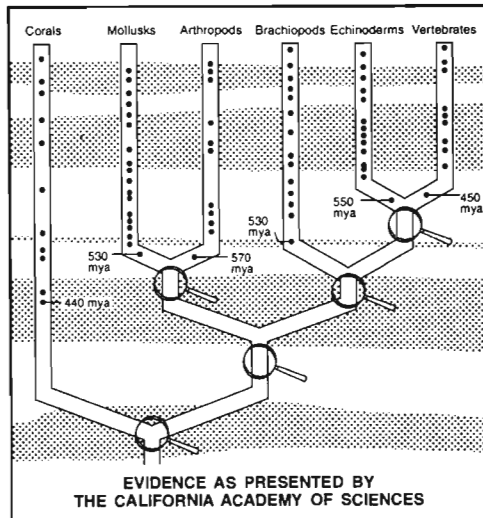


Figure 2

Time," and, if evolution is defined as "change through time," it provides strong evidence that change has taken place. It also presents a pattern of initial appearance of major taxa at variance with the Darwinian picture presented by the museum. *Teaching Science* suggests that new mechanisms of evolution need to be explored to explain the actual pattern, as opposed to the museum's hypothetical pattern. Our next generation of scientists should be challenged by such unanswered questions and unsolved problems.

An effective use of the critical-thinking skills exercise in *Teaching Science* is for the teacher to give the students the museum diagram to "correct their work." While some students begin to change the relative position of their fossil cards (by moving the corals below the mollusks, for example), most students immediately see that it is the museum diagram, not their empirical plot, that is in error. Thus, in addition to learning the crucial distinction between evidence and inference, the students discover for themselves that in science, it is evidence, not authority, that counts. In subsequent discussion, the students may also learn that pre-existing belief or ideology can override scientific objectivity, resulting in distortion of evidence and a faulty description of nature.

It is therefore ironic, as well as disturbing, that Aiuto insists on turning a scientific exercise into ideology by producing diagrammatic figures (patterned loosely after the *Teaching Science* figures) labeled "creationists and neocreationists" and what "evolutionists believe." It is not surprising, however, that this ideological overlay results in further distortions of evidence and misrepresentations of the scientific method. We would have liked to present the two sets of diagrams together here, for easy reference. Unfortunately, however, *NSTA Reports!* Editor Ann Wild has denied *Perspectives on Science and Christian Faith* permission to reprint these figures. Accordingly, unless you have access to a copy of the October/November 1993 *NSTA Reports!*, the following descriptions of the diagrams and their major differences will have to suffice.

The first *NSTA Reports!* figure differs from the *Teaching Science* figure "Empirical Presentation of Evidence" (Figure 1, p. 129) dramatically. Instead of having the vertical orientation of the *Teaching Science* figure, the California Academy of Sciences exhibit, and the geologic record, the diagram is turned on its side and oriented horizontally, and is presented without a scale of any kind. The six bars of plotted fossil data in the *Teaching Science* figure,

which graph the lifespan of the taxa in the fossil record, are "represented" in the *NSTA Reports!* diagram by lines of widely varying length, each of which begin at different points on the left with a single "separate point" of origin. (The taxon name is also listed to the left of the "point" of origin.)

Using measurement, the only scale available, to evaluate the first *NSTA Reports!* diagram, it quickly becomes clear that the diagram's proportions are not consistent with the museum's index of fossil record data. Approximate measurements of the lines in this diagram are: corals, $\frac{1}{2}$ "; mollusks, $\frac{3}{4}$ "; arthropods, $1\frac{1}{2}$ "; brachiopods, $\frac{3}{4}$ "; echinoderms, $1\frac{1}{8}$ "; and vertebrates, $\frac{5}{8}$ ". Note that the arthropods' (570 mya) line is $\frac{3}{4}$ of an inch longer than the mollusks' (530 mya) line, but the mollusks' line is only $\frac{1}{4}$ of an inch longer than the corals' (440 mya) line. A inaccurate picture of the relative length of the life history and relative appearance dates of the taxa is thus perpetuated.

Perhaps even more serious is the inaccurate picture presented by the widely varying positions of the "separate points" of origin of the invertebrate animal phyla. It is a fact of paleontology that the mollusks, arthropods, brachiopods, and echinoderms (as well as virtually all of the other invertebrate animal phyla) appear during the five-to-ten million year Cambrian explosion, now termed "The Big Bang of Animal Evolution" (*Science*, September 3, 1993). Thus, not only was *Teaching Science's* factual plot of the museum's data misrepresented, but *NSTA Reports!* readers were left with a false impression of the actual status of the fossil record, where these phyla appear simultaneously (geologically speaking).

In addition, the ideological label of "creationists and neocreationists" is applied to this diagram, which claims to be a representation of what in *Teaching Science* had been a factual and empirical presentation — a simple plot — of the museum's data. The full caption states that, "Creationists and neocreationists would have students learn that life was formed at separate points."

The second *NSTA Reports!* figure differs from the *Teaching Science* figure "Evidence as Presented by the California Academy of Sciences," (Figure 2, p. 129) in that it, like its "creationist" companion, is ideologically captioned "Evolutionists believe...." Beginning with a single dot on the far left, it presents a series of unlabeled branching lines, which end in six lines with the taxon labels on the right-hand side of the diagram. That is, it duplicates the branch-

ing pattern in Figure 2, shown as simple lines and turned on its side. Like the first *NSTA Reports!* diagram, it too lacks any detail, evidence, scale, or further data. The second *NSTA Reports!* diagram also preserves all the errors of the museum model: placement of the corals before the other taxa, placement of the echinoderms after the invertebrates, et cetera.² Therefore, like their "creationist" model, *NSTA Reports!*'s model of what "evolutionists believe" presents readers with outdated ideological constructs from the nineteenth century, rather than accurate and current information on the actual pattern of animal evolution in the fossil record.

Furthermore, Aiuto's *NSTA Reports!* models may be what some "creationists" and "evolutionists believe," but beliefs are not what count in science. In science, it is evidence that counts. That evidence must be presented accurately, without manipulation by ideological inference. This communication, as well as my letter to *NSTA Reports!*, originally ended with the hope that NSTA would join ASA in our efforts to have evolution taught *as science*. That hope has been dimmed by subsequent actions on the part of *NSTA Reports!*.

Update

In the Letters column of the February / March 1994 *NSTA Reports!*, Editor Ann Wild excerpted letters from W.R. Hearn and from me, saying that she declined to publish a 5-page official response from the ASA Committee for Integrity in Science Education. The two letters protested major distortions of fact in Aiuto's review as well as his *ad hominem* remarks about the ASA authors' intentions. Quotations demonstrating *Teaching Science*'s negative assessment of creationism were deleted from Hearn's letter.³ In an accompanying response, Aiuto said he failed to find in the letters or the book "any evidence that the entire effort by the ASA is anything other than an attempt to introduce creationism into public schools."⁴ The following quotation shows Aiuto's tone and his confusion of a postulated relationship with empirical evidence for such a relationship:

I was wrong, I will admit, to call these gentlemen "neocreationists." They are simply creationists, good and proper. The argument that the diagrams of postulated phyletic relationships are "inference" and not "evidence" is a patent attempt to introduce doubt about the empirical evidence for evolution. It is not meant to promote discussion about evolutionary mechanisms; it is an attempt to discredit the very idea of evolution....Sorry, gentlemen. I cannot retract my opinion that you guys are up to no good.

No evidence is offered in either Aiuto's original review or in his subsequent response for his allegations. He seems blind to the errors of fact we have substantiated. While this is disturbing in itself, there appears to be an even more serious problem involved than his distortions of our facts and motives. I refer to the problem of blocking access to information that would not only refute Aiuto's allegations, but allow biology teachers access to current scientific evidence in this forum. Consider the following:

1. The main (if not only) point of Aiuto's "review" and response was that the "insidious" ASA was attempting "to discredit evolution" and "to introduce creationism into the public schools." Direct quotations which would clearly refute this charge were deleted from Hearn's letter (see footnote 3).

2. *NSTA Reports!* has refused to print the portion of my letter which included both the figures from *Teaching Science* and from *NSTA Reports!* so that science teachers could compare the documents side by side. *NSTA Reports!* readers were consequently denied access to the actual evidence of the fossil record and were only allowed to see the ideological (and incorrect) distortion of it.

3. *NSTA Reports!* has denied *Perspectives on Science and Christian Faith* permission to reprint their figures on the grounds that the *NSTA Reports!* "figures simply reiterated the content of figures originally published in *Teaching Science*." After this refusal, *Perspectives* Managing Editor Patricia Ames faxed a March 25 letter to *NSTA Reports!* Editor Ann Wild asking her to reconsider her position. Key paragraphs of this letter stated:

I understand that you believe that the NSTA figures simply reiterate the *Teaching Science* ones, but there are others who strongly disagree....Your refusal to allow us to publish the figures alongside one another deprives science teachers of the opportunity to judge for themselves whether the figures are the same or different. Please note that Aiuto "in the spirit of open-mindedness advocated by Hearn...encourages readers to examine the documents in question." How are they to do this if your publication, having refused to publish the comparison yourself, then prohibits us from reproducing the documents?

I therefore urge you to re-evaluate your position in the spirit of authentic scientific inquiry and openness which is so essential to the scientific (and publishing) professions and their ethics.

Due to publication deadlines, a reply to this letter was requested by March 30. As of final press time in mid-April, no reply of any sort had been received.

4. Aiuto's statement in his response "In the spirit of open-mindedness advocated by Hearn, I do indeed encourage *NSTA Reports!* readers to examine the documents in question," is questionable for another reason. In the published letters and response, *NSTA Reports!* failed to include information on how to order the *Teaching Science* book or even to list ASA's location in Ipswich, MA. Instead, prominently inserted within Aiuto's response was complete information on how to contact the National Center for Science Education (NCSE) for information on the creation/evolution controversy (800/290-6006). Eugenie Scott, Executive Director of NCSE, has opposed *Teaching Science* and efforts by ASA to have evolution taught as science.⁵

ASA's desire to have evolution taught as science rather than ideology is expressed in the resolution adopted by its Executive Council on December 7, 1991.⁶ In addition to calling for the "forceful presentation of well-established scientific data and conclusions," the resolution urges (1) careful definition and consistent use of the terms "evolution" and "theory of evolution;" (2) clear distinction between evidence and inference; and (3) candid discussion of unsolved problems and open questions.

Aiuto and *NSTA Reports!* apparently insist on teaching evolution as rigid ideology. Their refusal even to permit discussion of this issue does not bode well for the future of science education. 🌐

Notes

¹The SS&C Project is NSTA's science education reform movement, patterned after the American Association Advancement of Science (AAAS) Project 2061. SS&C, funded by grants from the National Science Foundation and the U.S. Department of Education, is currently being pilot-tested in five states.

²There is no fossil evidence that corals arose before the other taxa in the figures. Impressions of jellyfish provide evidence that the phylum Cnidaria, to which the corals also belong, appeared before the other taxa.

³The following excerpt from Hearn's letter was deleted from publication in *NSTA Reports!* (February/March 1994).

Consider Aiuto's claim that quotes from scientists in *Teaching Science* are taken out of context, "twisted into statements that ostensibly support a creationist view." Here is what the ASA book actually says about creationist views:

Early in 1982 a federal court ruling struck down an Arkansas balanced treatment act. Litigation over a Louisiana law worked its way up to the U.S. Supreme Court, where in 1987 "scientific creationism" was declared to be a religious view that should not be taught as science (p. 12).

The Court ruled that "scientific creationism" is a religious view, not a legitimate part of science (photo caption, p. 13).

It has been well established (1) that the fossil record shows a succession of life forms, and (2) that mutation and natural selection provide a plausible mechanism for the formation of new species (sometimes called micro-evolution). Other lines of evi-

dence to be considered include the geographic distribution of plants and animals; similarities in embryonic development patterns; the genetic makeup of populations; and now structural similarities in the genetic material itself. From the cumulated evidence biologists have inferred a general macro-evolutionary principle: "the genetic relatedness of all living things."

Many aspects of evolution are currently being studied by scientists who hold varying degrees of belief or disbelief in God. No matter how those investigations turn out, most scientists agree that a "creation science" based on an earth only a few thousand years old provides no theoretical basis sound enough to serve as a reasonable alternative (p. 13).

⁴See note 3.

⁵Scott has praised California's 1990 Science Framework, which promotes teaching evolution as non-science. See J. Wiester, "Teaching Evolution As Non-Science: Examples From California's 1990 Science Framework" (*PSCF* Volume 43, Number 3, September 1991, p. 190). For example:

Nothing in science or in any other field of knowledge shall be taught dogmatically (p. xi). The character of science is shown to be open to inquiry and controversy and free of dogmatism... (p. 8). The evolutionary and fossil histories of a few representative groups should be presented in life science curricula in detail... (p. 135)

Contrast these statements with the following restriction placed on the presentation of evidence from the fossil record.

The evolution of life should be presented to students *not* as a disconnected series but as a pattern of changing diversity united by evolutionary relationships and distinguished by changes in the environment and adaptations to those changes (p. 132). [emphasis mine]

Scott has also stated that the *Teaching Science* book should not be used in classrooms, "because it teaches science from a sectarian religious perspective" (*Times Advocate/Escondido*, September 18, 1993, "Christian Biology Teachers Issue Evolution Booklet").

⁶The full background and text of "A Voice for Evolution As Science" is contained in the 1993 printing of *Teaching Science* (see also *PSCF*, December 1992, p. 252).

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Essay Review

Christianity and Early Modern Science: Beyond War and Peace?

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Wybrow, Cameron (Editor). Creation, Nature, and Political Order in the Philosophy of Michael Foster (1903-1959): The Classic Mind Articles and Others, with Modern Critical Essays. xxvi + 347 pp., frontis., bibl. Lewiston, N.Y./Lampeter, Wales: Edwin Mellen Press, 1992. \$79.95.

Wybrow, Cameron. The Bible, Baconianism, and Mastery over Nature: The Old Testament and Its Modern Misreading. (American University Studies, Series 7: Theology and Religion, Vol. 112.) vi + 231 pp., bibl. New York/San Francisco: Peter Lang, 1991. \$43.95.

Does the history of science show that Christian theology was the principal source of the differences between Greek science and early modern science? The question would have shocked Voltaire, provoked a heated denial from Andrew Dickson White, and astonished George Sarton. Yet just when that child of positivism, the "warfare" school of thinking about religion and science, seemed at the height of triumph in the period between the world wars, others were working to turn positivism on its head by showing that religious assumptions about nature and knowledge were deeply embedded in the ideas and practices we associate with the modern scientific world view.

One of these renegade scholars was the British logician Alfred North Whitehead, who argued that the very *possibility* of modern science depended upon the unconsciously held belief, derived from medieval theology, that the created order was indeed intelligible. Although Whitehead's process metaphysics have had a profound influence on some important

modern theologians and philosophers, his claim has thus far inspired little scholarship in the history of science, and must still be taken as an unestablished, if bold, conjecture. Another renegade was the American sociologist Robert Merton, whose work on the influence of Puritanism on the *social activity* of science in England has led to a veritable mountain of research, most of it inconclusive but still of great interest to students of the seventeenth century. Yet another renegade was the central figure in the books reviewed here, the late British philosopher Michael Beresford Foster. Foster's very strong claims about the influence of Christian theology on the *epistemic content* of early modern natural philosophy have also inspired much research, though a mere foothill next to Merton's mountain.

Foster made his long, convoluted, often confusing argument in a series of three articles published in the journal *Mind* in the mid-1930s, early in his career

This article is an edited version of a review which appeared in the March 1994 issue of Isis, p. 127-129. Used by permission.

as a Student (read, "tutor") at Christ College, Oxford. His unabashedly intellectualist approach focused on the doctrine of creation as the vehicle through which theology impinged on natural philosophy, and identified the source of modernity in science as the voluntarist attitude toward God within the Christian tradition. According to Foster, only a voluntarist theology makes God's creative activity truly free: the products of God's creative activity are not necessary, but contingent, from which it follows that the created world can be known only by a science that is fundamentally empirical rather than *a priori*.

The first of the volumes reviewed here reprints Foster's *Mind* articles along with four others (three of them almost unknown) that further develop his main points and offer brief remarks on some other theological and philosophical issues raised by modern science. An apparently complete, annotated bibliography of Foster's writings is also included. This is noteworthy in itself, since Foster remains a viable source of provocative statements about religion and science, and his articles (even including those in *Mind*) are hard or impossible to find on the shelves of many research libraries.

But there is much more, including reprints of two famous articles on Fosterian themes by theologian Rolf Gruner and historian Francis Oakley. Gruner takes issue not only with Foster, but with all "revisionists" who see Christianity as the source of modern science. His goal is to put a stop to the apologetic uses of revisionism, in the hope that "many theologians will perhaps think it in future more promising to further the prestige of their religion by maintaining that it demands man's respect for his so-called environment rather than its manipulation and control" (p. 214). This is a point well worth making. Science and technology are no longer viewed uncritically as unmixed blessings in many circles, and this fact alone ought to give pause to anyone seeking to base an apologetic argument on alleged causal connections between Christianity and modern science. Against revisionism Gruner argues that true Christianity is contemplative rather than active, and really has more in common with the classical world than with the modern. He also attacks the highly abstract, unhistorical nature of the revisionist argument — a fair challenge when leveled at Foster and certain others at the time Gruner raised it in 1975, but one that cannot really be mounted against much recent scholarship along Fosterian lines. Oakley's paper, first printed in 1961, calls attention to the medieval voluntarist notion that the laws of nature were imposed on the world by an act of arbitrary divine will. This, Oakley argues, became the dominant view of natural law during the

scientific revolution. In an interesting afterword written for this volume, Oakley (now president of Williams College) reaffirms his argument, but notes that he did not get it from Foster, whose essays he first read only when his own work was almost finished. (Like Reijer Hooykaas and some others, Oakley came to similar conclusions from a different, more genuinely historical starting place.)

Six more essays, written specifically for this volume, offer critiques of various aspects of Foster's main message and help round out the picture of Foster and his thought, which embraced political philosophy as well as science. Most readers of this journal will probably find little to interest them here. But some may want to read James Patrick's essay about Foster's place in historiography for its illuminating portrayal of Foster as a foil to the great Catholic historian and philosopher Etienne Gilson. As Patrick points out, Foster emphasized the seminal role of Descartes and the early modern tradition in bringing about modern science, where Gilson and the neo-Scholastics placed the origins of modernity further back, in the subtle theological atmosphere of the late middle ages. Since Foster opposed modern scholastics on this crucial point, his work was viewed favorably by the editor of *Mind*, a journal that otherwise was not given to publishing articles like Foster's about the importance of religious beliefs for modern science. This explains the contemptuous tone of an essay by one modern scholastic, Stanley Jaki, who comes to Gilson's defense in an attack on Foster replete with cheap shots directed at other scholars who do not share Jaki's view that modern science began in the fourteenth century. Jaki's patron saint is the French physicist and historian of science Pierre Duhem, who tried at the turn of century to show just how much modern science really owed to the medievals. For the sins of opposing Gilson and ignoring Duhem, Foster and those who agree with him are all but confined to perdition. It is unfortunate that Jaki has chosen to shout down, not to talk with, his opponents, for his important points about the relevance of medieval theology (which Foster missed or would not grant) are difficult to hear over the din.

Anyone interested in Foster's ideas, however, should read the superb essay by Wybrow which opens the collection. Here we find a study of Foster's troubled life, dedicated work, and self-inflicted death that is thoroughly researched and exquisitely sensitive to the various influences that operated upon him. This is followed by a splendid overview of his thought that is entirely without parallel in the scholarly literature. Wybrow concludes that Foster's attempt to "dance on the grave of Greek thought" (p.

43) while placing "the stamp of Christian approval upon a world-view already articulated by modern philosophy" was far too glib. For more than a few ASA members, this will be difficult to accept. Exaggerated claims about Christianity causing modern science have been popular among the membership for many years, partly because of their apologetic value and partly because the notion of contingency is often thought (with good reason) to be indispensable to a genuinely Christian view of nature. Writers such as Hooykaas and his disciple, the late Donald MacKay, have been particularly influential in this connection. My own research on theology and early modern science, however, has led me to conclude that Foster overstated his case;¹ thus far I agree with Wybrow.

The key word here is "overstated." Though Foster may have failed to prove a *necessary* connection between Christian theology and modern science, he focused our attention on two of the right questions — how in fact did early modern thinkers construe the relation between God and the creation, and what did they think this meant for human efforts to understand the created order?

For this reason I take issue with Wybrow's statement that the "only crucial question" in appraising Foster's work is whether "he hit upon a true affinity between modernity and Christianity" (p. 44). What matters most to historians like me is not whether Foster was correct about Christianity and modernity, but whether his analysis helps us to understand the relationship between theology and science as it was actually worked out in the seventeenth century. Here I can do no more than state my view that it most decidedly does, and note that I am hardly alone in saying this. Numerous carefully crafted historical studies, far more than Wybrow seems to be aware of, have established that early modern natural philosophers were deeply influenced by just the sorts of theological assumptions that Foster said *ought* to have influenced them.² If Foster erred by seeing certain historically contingent connections between theology and science as necessary ones, Wybrow errs by failing to see much significance in those very connections: where Foster claims too much, Wybrow claims too little.

Wybrow's book on Baconianism features a similar critique of the revisionist notion that Christianity is harmonious with modern ways of viewing the world. Like Gruner, he is anxious to refute the "mastery hypothesis," the frequently repeated claim that the Western urge to master nature is rooted in those parts of the Old Testament that give humans do-

minion over nature. Defenders of the hypothesis include those who use it for apologetic purposes (Foster and R.G. Collingwood are prominent examples), as well as those who see it as a black mark for Christianity (such as Lynn White, Jacques Ellul, and Theodore Roszak). Wybrow stands with Gruner above the fray by denying the validity of the hypothesis itself — as he demonstrates, it has never been properly documented by its proponents. Thereby he hopes to deflect both praise and criticism from Christianity and direct them toward what he believes to be the true source of the spirit of environmental conquest: Renaissance humanism, which equated human artistic and technical ability with the image of God. Early modern thinkers, he rightly says, made human beings "divine in essence, a kind of God on earth" (p. 166). Wybrow shows that such *hubris* gains no support from Genesis, which places specific boundaries on the scope and the degree of human dominion, and that both pagan and Biblical writers held to a limited view of dominion and were suspicious of the power of technology. Nevertheless Wybrow admits (p. 34) that the mastery interpretation of the Bible, though incorrect, has had "a profound influence" in the West since the late Renaissance. "By appealing to the Bible against the Greeks," he concludes (p. 193), Francis Bacon and other early modern thinkers "managed to win widespread consent for the building of a scientific society which proved to be *neither* Greek *nor* Biblical."

Wybrow's book is interesting and well argued, intellectual history on a rather high level. It is best understood as an answer to the recent call by several scholars for an historiography of religion and science that goes beyond the narrow ideological interests of both the warfare thesis and its apologetic antithesis — "beyond war and peace," to borrow the title of an influential article published a few years ago in this journal.³ It is hardly surprising that ASA members have tended more toward apologetics than warfare. Whether Wybrow offers a viable alternative remains to be seen; certainly it stands as a good candidate.



Notes

¹For details, and a much lengthier discussion of the Foster thesis, see my forthcoming essay, "Rationalism, Voluntarism, and Seventeenth-Century Science," in *Science and Belief: Proceedings of the First International Pascal Centre Conference*, scheduled to appear in 1995.

²Several of these studies are listed in my forthcoming essay, cited above.

³David C. Lindberg and Ronald L. Numbers, "Beyond War and Peace: A Reappraisal of the Encounter between Christianity and Science," *Perspectives on Science and Christian Faith* 39 (1987), 140-9, a slightly revised version of an article that appeared originally in *Church History* 55 (1986), 338-354.

Book Reviews

THEORIES OF EVERYTHING: The Quest for Ultimate Explanation by John D. Barrow. New York, N.Y.: Oxford University Press, 1991. 223 pages, selected bibliography, index. Hardcover; \$21.95.

John D. Barrow is professor of astronomy at the University of Sussex, England, and is the author of *The World Within the World*, and with Frank Tipler, of *The Anthropic Cosmological Principle*. Recently, reductionism has become popular in the science cycle, so some science theoreticians search for a "Theory of Everything" (TOE) and want to solve the big problems like the nature of the universe, its ultimate components, and its origins. In this book, Barrow lays out eight essential ingredients for a TOE and explores each in turn, tracing the way our knowledge has developed and how scientific discovery relates to our changing philosophical and religious thought in each area. This book grew out of a series of Gifford Lectures delivered at the University of Glasgow in January of 1988.

In the first chapter, he points out the human desire to unify all existing knowledge into a labyrinthine unity. The motivation for this is essentially religious, derived from the legacy of the great monotheistic religions. In the second chapter, Barrow investigates the first essential ingredients for a TOE: the laws of nature. Our search for a unified theory should reconcile the fields of quantum mechanics and general relativity. In chapter three, he goes on to examine the second essential ingredient, about the role of the initial conditions. The initial conditions for our universe are probably unknowable due to the ubiquity of chaotic phenomena. The role of initial conditions is related to the nature of time itself. A TOE should give both an adequate explanation. In chapter four, "forces and particles," the nature of matter is under focus. Why are there so many identical elementary particles in the universe? The symmetry principles of string theory are related to this phenomenon. However, this could either be a solution or a consequence.

In the fifth chapter, the question of constants of nature is raised. Why do they take the particular values we measure? Why are they constants — or are they really constants? Then Barrow discusses "broken symmetries" in chapter six. The questions about chaos and chance are raised for the predictability from a TOE. In chapter seven, organizing principles are discussed. Increasing levels of complexity in the biological world are presented as an antidote to pure reductionism, and a TOE will make little or no impact upon the problems of the origin of life and consciousness. The problem of selection biases is covered in chapter eight. A complete understanding of our observations of the physical universe requires an understanding of those elements which bias our observations and interpretations of data. Our observations are local and could be biased.

In the final chapter, the possibility of using mathematics to build a TOE is investigated. The author concludes that

the world is not totally algorithmically compressible. Therefore, the most complete TOE with the most comprehensive mathematical explanation, cannot account for the uncomputable varieties of human experience and thought. In this book, the author has shown that while a TOE may be necessary for us to understand the Universe around and within us, it is far from sufficient. This book shows Barrow to be an accomplished humanist, scientist, and philosopher of science. For those who are interested in the interface between science, history, and religion, this book is highly recommended.

Reviewed by T. Timothy Chen, National Cancer Institute, Bethesda, MD 20892

UNDERSTANDING SCIENCE: An Introduction to Concepts and Issues by Arthur N. Strahler. Buffalo, New York: Prometheus Books, 1992. 381 pages, bibliography, index. Hardcover; \$25.95.

The author's stated goal in writing this book "is to make the philosophy of science accessible and intelligible to science students, their teachers, and just about any person with a liberal college education who would like to learn something about the subject." Arthur Strahler is a geologist who has authored or coauthored textbooks on physical geology, earth science, physical geography, and environmental science. He also wrote *Science and Earth History: The Evolution/Creation Controversy* in 1987, which he frequently quotes from in this book.

The book is divided into two parts. The first part is an overview of science, of what he calls the new philosophy of science, and a discussion of pseudoscience. The second part is dedicated to relating science to other knowledge fields, such as logic and mathematics, ethics, and religion.

Strahler's perspective is set forth in the introduction where he says, "The modern scientific view of the universe can be described as *naturalistic*... The naturalistic view is that the particular universe we observe came into existence and has operated through all time and in all its parts without the impetus or guidance of any supernatural agency. The naturalistic view is espoused by science as its fundamental assumption" (p. 3). I would think few members of the ASA could agree with such a statement.

The new philosophy of science he describes in Part One is basically that nothing can be known for certain, or, rather, things can be known only with increasing or decreasing probability. For example, the "Law" of gravity is known to be correct with a probability approaching 1. Consensus among those competent to judge is the gov-

erning criterion for determining the probability of a given hypothesis being correct. ("True" is a forbidden word in the vocabulary of the new philosophy of science because it implies something unattainable, namely absolute truth.) Thus, only an elite group of people may determine what is correct or not about the world in which we live.

In Part Two of the book, Strahler deals with how science relates to other knowledge fields. He divides knowledge into two classes, perceptual and ideational. Perceptual knowledge includes only science and human history, while ideational knowledge includes such belief fields as ethics, morality and religion. Only perceptual knowledge may be used in any formulation of a view of reality. While ideational knowledge is interesting, it is of little practical value (with logic and mathematics being the possible exceptions). Chapter 11, on the supernatural realm, is where we finally learn that the author holds to an ontology he calls mechanistic monism. In this view, no supernatural realm exists. In Chapter 13 we learn that ethics and morality are evolutionary devices that arose to ensure group survival. A manager class invented the supernatural realm to increase compliance of the managed class with the ethical principles they thought would ensure group survival. Why this manager class would see group (as opposed to individual) survival as a "good" thing is not explicitly defended. Since religion has a place in this view of reality, he insists that it cannot be classified as atheistic. I was also disappointed that the answer to "the grand sez who" (quoted from Arthur Leff by Phillip E. Johnson in *First Things*, March 1993) question was not addressed by Strahler. The question is basically, why should any individual today forgo any pleasure or refrain from any pursuit of selfish interests? Anything claimed to be ethically wrong can be answered with "the grand sez who."

Chapter 14 discusses creationism (broadly defined) and it is here that Strahler attacks the ASA and others who hold to a dualistic ontology. He increases the rhetoric to fever pitch as seen by the following: "...we turn to the seething cauldron of modern Christian theology. In this pot theologians brew what are euphemistically called 'liberal' scenarios that they think can wed theology to modern science" (p. 355). Passages such as this, which hint at his attitude toward any view other than his own, can be found throughout the book.

I think the author achieved his stated purpose of writing a book on the philosophy of science that is readable by the average science student. I found the book very helpful in understanding some of the technical philosophical jargon that is often used in articles that appear in *Perspectives*. But, as this final quote illustrates, since Strahler rejects a dualistic view of reality, there is little here for a person of faith to agree with. "A creationist stands in opposition to a scientist; these two individuals stand on opposite sides of a fence or wall that separates their unlike and mutually exclusive ontologies and epistemic fields." (p. 345).

Reviewed by David K. Probst, Assistant Professor of Physics, Southeast Missouri State University, Cape Girardeau, MO 63701.

MAN AND CREATION: Perspectives on Science and Theology by Michael Bauman (Ed.). Hillsdale, MI: Hillsdale College Press, 1993. 306 pages, index. Paperback; \$9.95.

In this book, eleven writers tell how they see the relationship between science and theology. Try to formulate your own view on the relationship before reading the book. Then to see how others do it, start reading the essay by Richard Bube "Seven Patterns for Relating Science and Theology." To my regret, it does not include the way I see it, though the last pattern comes close. I like Bube's essay because it is the only place where "sin" and its effects are mentioned (p. 93).

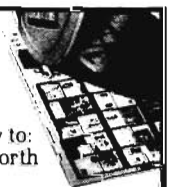
Use of the word "science" for "experimental science" shows a certain implied bias. I agree therefore with the editor Bauman when he notes on p. 261 this philosophical and theological naiveté of many scientists. As an illustration to show how deep the misunderstandings are, I point to the essay of the editor Bauman himself. It is ironic that I have to accuse him of the same naiveté.

An example: Bauman claims on p. 249 that scientific world views changed completely over the last centuries. Contrary to that, he claims that the reorientation in Christian tenets in the sixteenth century did not require any fundamental change in orthodoxy. As proof, Bauman then refers to the fact that the Apostolic Creed remained. However, the creed is not theology. Theology changed drastically. The sacraments were not central anymore, the Word became central. The split between the holy and the secular disappeared. True, even the reformers had to struggle with remaining scholastic tendencies. These remaining tendencies often caused splits in protestant churches. Theology and its servants still were (and often are) placed on a pedestal. A certain reading of the Bible is the seen as the only possible reading: the science of theology rules faith.

Generally speaking, I miss a willingness to understand opposing views in this book. For example: in the essay of Phillip E. Johnson (Professor of Law at the University of California, and writer of *Darwin on Trial*) I do not see an understanding of the difficulties in the disciplines in which most of us work. Johnson may be a good lawyer, but he only notices weaknesses in our reasoning. He does not help us, since he does not propose an alternative that takes all relative facts into account. A scientist proposing a new theory is faced with facts which seem to contradict known theories. Consequently his reasoning will have, at least at first, gaps and jumps. This weakness is not limited to physics, etc., but is even true in the interpretation

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of the Bible. Both J. P. Moreland (professor of Philosophy in the Talbot School of Theology), and the book's Editor, Michael Bauman (Associated Professor of Theology and Director of Christian Studies at Hillsdale College) use uncritically a philosophy that goes back to pagan Greek philosophy.

They are not alone in not recognizing that God speaks in creation and in the Bible. Several other essays do not address the resulting difficulties either. Life is not seen as a unity to be lived as servants of Christ. I believe that we can only go on if we have a distinct Christian world view. To show how such a world view is possible, I recommend the reading of *Creation Regained* by Albert M. Wolters and *The Transforming Vision* by Brian Walsh and J. Richard Middleton. The last book has an extensive bibliography by discipline that includes books with views not shared by the writers.

Studying the book is worth the effort. A shortcoming of the book is that it has no bibliography.

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HEALING THE EARTH: A Theological Perspective on Environmental Problems and Their Solutions by Richard A. Young. Nashville, Tenn: Broadman and Holman Publishers, 1994. 333 pages, appendix, indices.

This book is a worthy addition to the evangelical discussion of the ecological crisis. The writer brings credentials both in biblical studies (Ph.D.) and science (B.A. in geography). He displays a good grasp of the subject matter and creativity in discerning relevant issues in which some others have over looked.

Throughout the book, Young develops a contrast between three important, environmental perspectives. First, there is the pantheistic perspective, in which Nature is important because Nature is God (or Goddess). Second, there is the anthropocentric perspective, in which man's needs or authority are decisive in manipulating nature. (The abuse of biblical doctrine which gives humanity a virtually selfish, absolute authority over nature, Young characterizes as "theanthropocentric," that is, a human centered view with divine authority.) Third, there is the theocentric view, in which nature is to be respected because nature is valuable to a theistic deity.

Chapter 1 reviews the environmental case against Christianity. A hint of Young's general defense comes when the origin of "destructive attitudes" in Christianity is traced back to Greek rather than Old Testament thought (p. 11). This defense is further developed in chapter 2 by showing that the alternative ideologies also practice their own ecological abuses. Primitive animists, including Na-

tive Americans and Australian aborigines, on occasion abused the environment to the extent they were able (pp. 29-30). Young argues that secular thought, "with no transcendent source of values," leads to anthropocentric abuse of the environment (p. 46). He concludes that the present day negative stance towards nature "stems more from secularization of nature than from the desacralization of nature" (p. 47).

In chapter 3 Young posits the holistic unity of nature. He then argues that neither monistic philosophy nor the new animism of the Gaia hypothesis gives an adequate ideological base for environmentalism. Within this unity of nature, the right relationships or harmony between all the "points" is necessary. This principle leads to chapter 4, in which Young rejects a purely utilitarian view of nature's value. He points out that Shinto Japan, despite its animistic view of nature, has not avoided such utilitarian ecological abuse (p. 78). In the last word, Young's view of the value of nature is that its value and dignity grow from the fact that nature is valuable to God (p. 83). In chapter 5, Young argues that only a theistic deity, who is both transcendent and still immanent, can thus attribute value to nature.

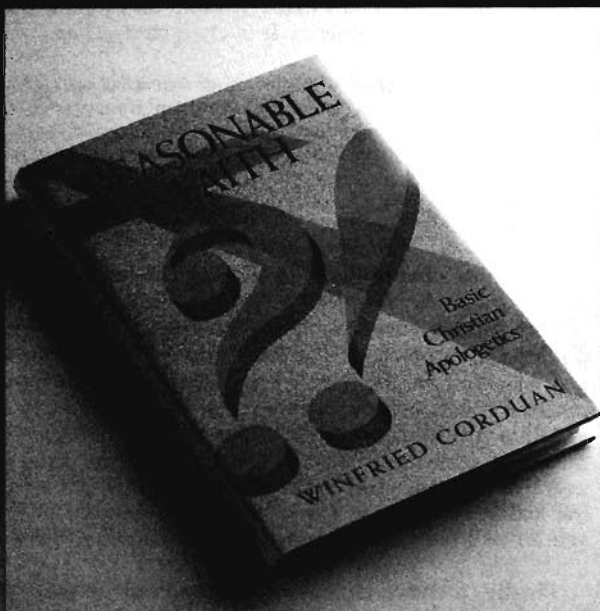
In chapter 6, he argues that the biblical perspective properly understood, is neither anthropocentric nor theanthropocentric. Nor is it biocentric. The genuinely theocentric biblical view is the only defensible base for the value of nature. Some will feel that Young has gone to an extreme in arguing that all death and natural evil are ecological consequences of sin (chapter 7).

Young views the "dominion mandate" (chapter 8) as ecological rather than cultural (p. 161). This mandate demands that humanity maintain the ecological harmony noted above (p. 162). The servanthood (rather than the capitalistic exploitative) model of the mandate then becomes the guide for biblical faith (p. 171). Chapter nine asserts that, though man is fallen, the image of God still leaves humanity in a position to make some "limited progress" with the environment (p. 204). Chapter 10 asserts that only a theocentric view can give a plausible ethic for environmentalism. In chapter 11, Young concludes that biblical Christianity, despite the errors of Christians in the past on this issue, should really be guided by the positive, biblical affirmation of nature (pp. 250-252). This is harmonious with the value of nature posited above. The Christian environmental agenda in chapter 12 will strike many readers as lacking in specifics.

This book is thorough, creative, and suggestive, although no one will completely agree with it. For the present reviewer, the most serious lack in this and other Christian books on the environment is that they seem to assume that the ideal environment is static. This might conflict with evidence from science, history, and the Bible, which would indicate that some environmental development or enhancement could be a legitimate part of the evangelical perspective.

Reviewed by Andrew Bowling, Division of Biblical Studies, John Brown University, Siloam Springs, AR 72761.

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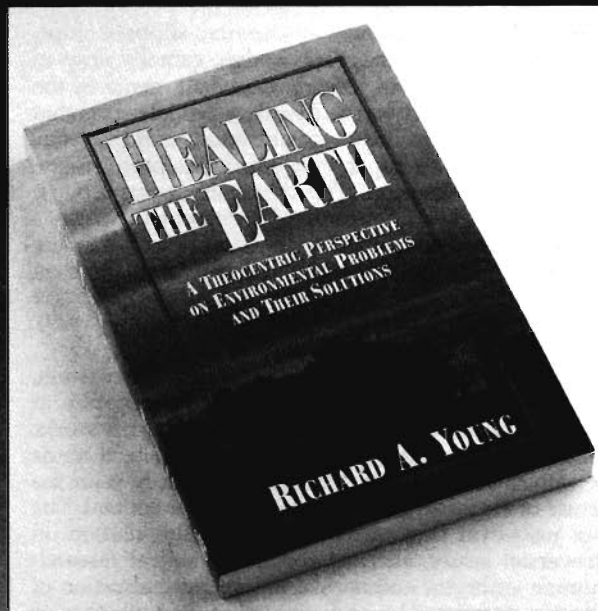
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Healing the Earth: A Theocentric Perspective on Environmental Problems and Their Solutions by Richard A. Young. (336 pp. \$19.99 ISBN 0-8054-1038-4)

SLIPPERY SLOPE ARGUMENTS by Douglas Walton. Oxford: Clarendon Press, 1992. 282 pages, references, index. Hardcover; \$65.00.

What do these terms have in common: slippery slope, falling dominoes, thin edge of wedge, camel's nose in tent, foot in door, tip of iceberg, snowball, genie in the bottle, sorites? The answer is that they are all terms that have been applied to a type of argument that proceeds step by step from an apparently innocuous premise to a final startling conclusion. The dictionary sums up the meaning of "sorites": "A form of argument in which a series of incomplete syllogisms is so arranged that the predicate of each premise forms the subject of the next until the subject of the first is joined with the predicate of the last in the conclusion" (*American Dictionary*, 1975).

This is a book on the technique of logical argumentation, written by Douglas Walton, professor of philosophy at the University of Winnipeg, and the author of many works on informal logic and argumentation. As such, it tends to be rather technical and concerned primarily with the structure of arguments rather than with their content. The author uses over fifty case studies of argumentation on controversial issues, such as abortion, medical research on human embryos, euthanasia, the decriminalization of marijuana, pornography and censorship, and whether or not the burning of the American flag should be banned. His prime concern about each slippery slope argument is whether or not the particular form of the argument is fallacious or not, and what strategy is best for one involved in debate. His conclusion is that the slippery slope approach can be used fallaciously, but can also be "a reasonable argument, fulfilling a legitimate function in an argumentative dialogue." Even in this context the definition of "fallacy" adopted is a fairly technical one: "A fallacy is to be understood as a particular type of argumentation tactic which can in some cases be used correctly to fulfill or advance legitimate goals of reasonable discussion, but is used in a particular case at issue as a systematic type of argumentation tactic to try to subvert the goal of the discussion and unfairly get the best of the other party." A general conclusion reached is that "the slippery slope argument is fallacious where it is used as a tactic to hinder or block a reasonable dialogue, in violation of the rules for the proper conduct of that type of dialogue." Or again, "...when a slippery slope argument phrases its conclusion in terms like 'inevitable' or 'can't be stopped' or 'must happen,' there are always strong grounds for suspecting that you are dealing with a fallacious case."

The central portion of the book is concerned with four major variations of slippery slope arguments. (1) It is argued that if some new step is taken, it will become a precedent for another step, which will in turn become a precedent, and so on to total disaster. This approach has been given the name of thin edge of the wedge, camel's nose in the tent, and foot in the door. (2) It is argued that once a process is started, the vagueness of key terms involved means that there is no cut-off point; this approach is called the "heap" argument (sorites), or the continuum argument. (3) It is argued that once a step is taken, it will cause a second step, which will then cause a third

step and so on to disaster; this approach is called the domino argument, the snowball argument, or the genie in the bottle argument. (4) Finally there may be a full-scale slippery slope argument that combines all three of these variations as subarguments. It is characterized as

a complex network of argumentation that involves eight component types of argument: (1) argument from gradualism, (2) argument from consequences, (3) practical reasoning, (4) argument from analogy, (5) argument from popular opinion, (6) argument from precedent, (7) causal argumentation, and (8) the sorites type of argumentation, which exploits vagueness.

In a final chapter on practical advice on tactics, the author gives six tactics to counter a slippery slope: (1) "Claim that the negative consequence won't really follow," (2) "cite the uncertainty of the future," (3) "modify the goal to eliminate the negative consequences," (4) "stress positive consequences, arguing that these outweigh the negative consequence," (5) "choose some alternative means of achieving the goal, one that does not have the negative consequence," and (6) "argue that not taking the action in question (or taking an opposed course of action) will have even worse negative consequences."

Finally, a major conclusion of the book is that "the textbooks can move towards a more balanced and adequate account of the slippery slope argument by recognizing more clearly that it is a technique of argumentation that can be used reasonably in some cases and unreasonably or improperly in other cases."

This is a specialized book that can serve as a valuable resource in a specialized area. It does not in itself deal with issues involving the interaction of science and Christian faith.

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THE BLACKWELL ENCYCLOPEDIA OF MODERN CHRISTIAN THOUGHT by Agister E. McGrath (Ed.). Cambridge, MA: Blackwell Publishers, 1993. 701 pages. Hardcover.

The editor of this large book, Agister E. McGrath, is research lecturer at Oxford University and research professor at Regent College. He was assisted by nine consulting editors and 92 contributors of articles. The contributors are associated with some of the most prestigious universities in the world. Although there are no pictures, the book does have a substantial index and a diminutive glossary.

In the Introduction, the editor states that this compendium is intended to give the reader an authoritative, readable, and reliable reference source about the main features of modern Christian thought. Further, it aims to stimulate inform, and direct attention to other sources for further

study. This it does by providing a brief bibliography at the conclusion of each article.

This book discusses the development of central themes of Christian thought, those topics which can be found in a systematic theology book. It also discusses such themes as political theory, aesthetics, ethics, music, and philosophy. Additionally, it covers topics of particular interest to readers of *PSCF* such as the impact of the sciences on Christian thought. There are major articles on the biological, physical, psychological and social sciences.

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

IN THE BEGINNING: After COBE and Before the Big Bang by John Gribbin. Little, Brown and Company, 1993. 255 pages, index, bibliog. Hardcover; \$22.95.

John Gribbin may be familiar to science readers as the author of *In Search of Schrodinger's Cat*, *Stephen Hawking: A Life in Science*, and more than 30 other books. His training in astrophysics at Cambridge provided him with his expertise and interest in astronomy and cosmology.

The springboard for this fascinating book is the interpretation of the data from the Cosmic Background Explorer (COBE) satellite. Its mission was to determine the uniformity of the radiation discovered in the early 1960s by Penzias and Wilson. The existence of this radiation had given credence to the Big Bang theory of the origin of the universe. Refinements of the theory, however, showed that it could explain the existence of galaxies only if that background radiation exhibited fluctuations of 30 millionths of a degree from its 2.375 Kelvin temperature. The dramatic discovery by COBE in 1992 of these predicted ripples opened a new chapter in cosmological thought. Gribbin takes the opportunity in this book to be one of the first to explain the implications to laypeople.

Gribbin considers the COBE results to be the "third most significant cosmological discovery of the century" (p. 19), superseded only by the discovery of Hubble's law and the discovery of the background radiation. He believes that the data confirm the inflationary version of the Big Bang theory and that "we live inside a black hole" (p. 243). His major objective is to argue that our entire universe is a living entity.

To make this argument, Gribbin weaves a fact-filled tale of the universe. The first part reviews the theories of the origin of the universe and shows how the COBE results differentiate among them. The second part addresses the question "What is life?" It is an excellent summary of the latest views of chemical and biological evolution. He advocates the Gaia hypothesis first published by Jim Lovelock. The Gaia hypothesis, named after the Earth goddess, considers the entire planet Earth to be a single living organism. Gribbin's intent is to extend this concept to the

entire universe. He describes the universe in the third part of the book. Here he presents examples of the "Goldilocks effect," the many amazing "coincidences" necessary for the universe and life itself to exist. He cites the energy levels of carbon-12 and oxygen-16, first publicized by Fred Hoyle, and the peculiar properties of water. Finally, in the last part of the book he argues that the universe is alive, not metaphorically but literally.

The significance of a living universe has several different aspects. First, from a scientific perspective, life refers to a complex set of interacting elements that exhibits behaviors such as reproduction, evolution, self-adjustment to the environment, etc. This provides a new and useful approach to studying and understanding the universe, but is independent of whether the term "life" is applied literally or metaphorically. A second implication is spiritual in nature and has been exploited by the New Age movement, not necessarily endorsed by Lovelock or Gribbin. A third aspect is one that Gribbin advocates. A living universe is one that he believes is evolving and that the evolutionary process explains the Goldilocks effects as well as the origin of the universe. Therefore "there is no longer any basis for invoking the supernatural" (p. 254).

Evolution requires a large population, variability within that population, and a means for selection among that variation. Gribbin argues that within every black hole (essentially infinite in number) there exists another universe where the laws of physics are reset with arbitrary constants and formulations. Selection occurs through the short lifetime or non-reproducing (i.e., failure to generate more black holes) character of most universes. Unfortunately for Gribbin and his hypothesis, the existence of universes of any kind in black holes can never, by definition, be detected. Such a theory appears to be outside the realm of testability.

Although ASA readers are not likely to agree with Gribbin's conclusions, they will undoubtedly be fascinated by a book full of facts and the latest theories in evolution and cosmology. Though somewhat unevenly written, as it contains numerous facts and oversimplified illustrations, this book is an important part of the library of anyone interested in cosmology. Now that Gribbin and others are plugging the last gaps in our understanding of the origin of the universe and sealing the fate of the "God of the Big Bang," it is important for us to proclaim the living God of the universe(s).

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THE MEANING OF LIFE AT THE EDGE OF THE THIRD MILLENNIUM by Leonard Swidler. New York/Mahwah, N. J.: Paulist Press, 1992. 116 Pages. Paperback; \$8.95.

Swidler wants a dialogue among world religions and ideologies. Under the heading "Semitic Religions" he

groups Christianity, Judaism and Islam. He compares the "understandings" (basic ideas) of this group with Hindu, Buddhist, Confucian, Taoist, and Marxist "understandings." Since the meaning of life is expressed differently in these religions and ideologies, Swidler uses unusual words to show what he sees as common ground. For example, when we say "God" Swidler says "Ultimate Reality," or "Ultimate Person."

The writer says that Christ was not Jesus' family name. People knew him as Rabbi Yeshua Ben-Yosep, or as Yeshua ha Notzri (the Nazarene). The writer hardly uses the name Jesus, but talks about Yeshua. He says that "Christ" is a religious/theological idea. Millions of Christians do not focus their attention on the *source* of Christianity, Yeshua. Instead, says Swidler, they concentrate their thinking on ideas, creeds, councils, the Pope, or the Bible, especially the New Testament. According to the writer, the "alleged" super-natural dimensions (miracles) of Yeshua are not helpful to the contemporary world. He calls them distractions when taken literally.

The Fall into sin is hardly mentioned, and consequently the central mission of Jesus is misunderstood. Instead we read:

Yeshua's view of life is thoroughly optimistic. God has created all humans good. Though they may have wandered into one kind or another confusion, or even slavery, they can find their way back to a properly ordered life, to the "Reign of God," wherein the laws God structured into humans are again followed. (p. 77)

The core of these laws are the two great commandments of Matthew 22:37-39. Swidler concludes that to love one's neighbor one must first love oneself. If we do that we can fulfil the first commandment. It seems that according to the writer we must first love self, then neighbors and only then are we able to love God. This is the wrong way around in the opinion of this reviewer. In 2 Tim. 3:2 we read that a sign of the distressing last times will be that people will be lovers of self.

Swidler notes that Greek philosophy had a great influence on Christianity. This, with the Roman legal system, was the foundation of modern western civilization. The idea of "soul" as used by most Christians came from the Greeks, and he applauds it. Other influences Swidler claims to be of the Greek origin he rejects. For example, the "Stoic" parts of the "deutero-Pauline" and "pseudo-Petrine" letters (for example, Ephesians 5:21-6:6; 1 Peter 2:13-14) are rejected. He does not try to understand these texts positively. It seems that Swidler only listens to Scripture if it suits him.

The writer does not discuss Protestant theologians. One wonders why "dialogue" with non-Christian religions would be more important than talking with Protestant Christians. The reading of this book leaves me dissatisfied. It seems that Swidler wants to unify all religions into one. He notes similarities and wants to build on them. He forgets sin and its consequences in personal and communal life.

When we now try to unify nations and faiths by using the power of dialogue instead of the power of proclamation, we will not unify the world in Christ. On the contrary, we are losing the significance of Jesus Christ who came to save sinners. I do not recommend this book if you want to study relationships of faith and science. The book may be of help if you want to know how Eastern religions have appeal to some "Christians."

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SCIENCE AS WRITING by David Locke. New Haven: Yale University Press, 1992. 237 pages. Hardcover; \$27.50.

The goal of this book is to convince the reader that the language of science is not a passive receptacle of content, but that it plays an active role and also reflects the idiosyncrasies of scientists. Therefore, the language of science should be treated very much as the language of literature, that is, it should be subject of the same analyses as the language of poetry and *belles-lettres*. To be sure, there are different ways these analyses can be made, and Locke discusses in his book six approaches to the analysis of the language of science. These approaches are representational theory, which sees a text as representing the world; expression theory, for which the text is an expression of inner life of its author; evocative theory, which sees the work as the evoker of the reader; art-object theory, for which the text is primarily an object of art; artifact theory, which analyzes the text in its social context; and instrumentalist theory, for which the text is basically a tool.

The author shows that representational theory is impossible (which after Kant is very much a platitude); that scientific texts are not devoid of the emotions and feelings of their writers, although they are to a much lesser extent than texts of literature; that "rhetorical considerations are, and should be, an important part of most, if not all, scientific discourse" (p. 89); that scientific papers are written in order to spur an interest; that scientific writing is cut-and-dry; that science is not free of social pressures, which is reflected in its choice of research topics and emphasis of some results.

In spite of his emphasis on language, Locke admits that in scientific writing there is something "out there," but that this something is always seen "through the medium of thought," and since thought "in large part, is thought in language," we are confined to language to the extent that "the world is the word" (p. 199). Hence, in the spirit of cognitive psychology, moral and aesthetic dimensions are disregarded as possible mediators between humans and reality; only a cognitive dimension is retained as the channel through which man can have contact with the world. But he claims even more. Since "the world is the word," all scientific changes "come about by operations

on the language" (p. 175), and "it is always language that gives birth to a known reality." Thus, after discarding a representational view, Locke moves to the other extreme and sees language as a filter through which we can perceive reality. Language is our only mediator, the only means of acquiring knowledge. Not even Kant in his Copernican revolution claimed that much. After all, to him practical reason had priority over theoretical reason. In his insistence on the role of language in reporting scientific research and in explaining data, Locke gave it a predominant role in scientific reasoning, so that a scientist has no contact with reality, and science becomes a linguistic child play of concepts. Rules of scientific research are reduced to scientific rhetoric; rules of observation and experiment are replaced by rules of writing papers. Science is a game limited to language, and written documents are science (p. 204). Who would now find doing science appealing?

However, what is the nature of the language of science? As Locke disarmingly admits, "precisely what scientific language is, then, what its ultimate characteristics are, how it works in the last analysis, I will not claim to know" (p. 201). But the author has no doubts about its preeminence in our contact with reality.

The role of language is undeniably important in science, but Locke reduces science to language; in his combats with ascribing a sacrosanct position to science, he uses deconstructive reasoning, a philosophical fad of the day, and abolishes even a thought about absolutes as unseemly. There remains only de Saussurian *glissement* which Derrida so abundantly uses in his *Of Grammatology*. It is an ideology of a demolition man who sees in tearing things apart the way of revealing truth (if there is such).

This book is not free from factual errors, for example, swerving (*paregklesis*) was introduced by Epicurus, not Lucretius (p. 154); -on in *photon* is not unit (which is *hen*) (p. 170); including Hume in the skeptical tradition is an overstatement (p. 171). Also, Locke's book is not free from verbosity: material for a large essay is stretched to the size of a book. His language is also stilted and pompous, thereby making easy reading difficult. The book, written in the spirit of deconstructionism, offers no new perspective (as deconstructionism itself does not), and even makes science look like a caricatural endeavor confined to language alone.

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

ORIGINS OF LIFE by Freeman Dyson. Cambridge, England: Cambridge University Press, 1985. 81 pages. Hardcover.

This book is a version of the Tamer Lectures given at Trinity College, Cambridge in 1985 and addresses some

of the scientific and related philosophical questions surrounding the origin of life. It does not consider any of the theological or associated metaphysical issues pertaining to origins.

Dyson presents the hypothesis that life began twice, once with metabolising organisms based on protein structures, and on a second occasion with replicating organisms based on nucleic acids to produce a parasitic organism something akin to a bacteriophage. That is, the two main processes we see in living organisms today, replication and metabolism (to achieve homeostasis), represent two separate lines of evolution. Dyson favours this view of origins in part because it fits well with the views of Lynn Margulis that the main internal structures of eukaryotic cells did not originate within the cells but are descended from independent living organisms which at some point invaded the cells.

Dyson is concerned largely with the origin of the first living organisms and one is struck in reading the book with the fact that the greatest difficulties in developing a complete evolutionary theory come in getting to the first living organisms. The step from bacteria to humans is small compared to the step from non-living matter to the first bacterium-like organism.

The book is organized well and the author does not take himself too seriously, freely admitting the highly speculative nature of most of his ideas. Because of the mathematical modelling which it contains, and the speculative nature of the discussion, this book appears likely to be of most interest to specialists or to those with a particular interest in scientific theories of origins. However, the book is useful in providing a summary of some of the current views and hypotheses regarding the mechanisms of the origin of living organisms.

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THE UNIVERSE STORY: From the Primordial Flaring Forth to The Ecozoic Era, a Celebration of the Unfolding of the Cosmos by Brian Swimme and Thomas Berry. San Francisco: HarperSanFrancisco, 1992. 305 pages, index, timeline, glossary, bibliography. Hardcover; \$22.00.

The Universe Story is a fascinating book. The authors tell how they see the history of the universe from the Big Bang, or "Flaring Forth," as they call it, to the next century. They concentrate on the beginnings of the universe, of the earth, of life, of plants, of animals and finally of man. They then tell about the development of human society from small hunting groups to the present society, and finally to the coming century. Because they tell a story, there are no footnotes. The bibliography provides, however, an insight into their sources.

In the Introduction the writers give their reason for writing:

The historians, even when articulating world history, deal not with the whole world but just with the human, as if the human were something separate from or an addendum to the story of the Earth and the universe. The scientists have arrived at detailed accounts of the cosmos, but have focused exclusively on the physical dimensions and have ignored the human dimension of the universe. In this context we have fractured our educational system into its scientific and its humanistic aspects, as though they were somehow independent of each other.

When discussing objects, the writers stress that we must realize that to know the whole thing we need to analyze intellectually its component parts. But we cannot know the component parts without knowing their functioning in the unity of the whole. Only then do we learn the integral nature of whatever we are researching. That means that knowledge about the universe must include self-knowledge. We can no longer talk about an objective world out there. The writers warn against reductionism: trying to understand things by considering only one aspect of it.

This sounds familiar to anyone who is familiar with philosophy as taught by Vollenhoven and Dooyeweerd. There is, however, a very big difference with the thoughts in the book under review. Vollenhoven stressed the hand of God in all that happens. The writers of the book under review talk about developments in the universe as if the older things create the newer things. They do not mean this in a materialistic way only. Chapter two ends: "The mind that searches for contact with the Milky Way is the very mind of the Milky Way galaxy in search of its inner depths."

Creative powers of life are, according to the writers, chance, choice and necessity. In their interpretation of the evolutionary story they go beyond the ordinary scientific accounts. They do not only accept natural selection and genetic mutation but also a third cause: conscious choice. The universe had from its beginning a self-organizing power.

Chapters eight through thirteen describe human history: from hunting and gathering groups, via neolithic village, classical civilizations (Near East, China, Meso-America, Cambodia, Israel, Greece), the rise of nations, the present time to the next century. Though the universe is evolving in an identifiable sequence of irreversible transformations, the writers want us to return to the mythic origins of the scientific venture.

Swimme and Berry warn us that the path of progress to the myth of Wonderland will lead us instead to Wasteland. Ever increased consumption is not possible with limited resources. They write in the last chapter: "to glory in a rising Gross Domestic Product with an irreversibly declining Gross Earth Product is an economic absurdity." And: "among the challenges that face governance in the human order is the relationship of national governments with each other, with particular reference at the present

time to the more industrialized northern nations of the planet that are exploiting the less industrialized southern nations." This chapter contains more challengers. The writers call us back to the time when man lived with nature. It affects every area of life, just like our faith. There is still a faith in a self-sufficient creation, without a Creator.

Despite these facts I heartily recommend this (unChristian) book be studied. As Christians we should know the spirit of the time and listen to valid criticism of our way of life.

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RIGHTS, KILLING, AND SUFFERING: Moral Vegetarianism and Applied Ethics by R.G. Frey. Oxford, England: Basil Blackwell, 1983. 256 pages, index. Hardcover.

This book addresses the question, "Is it morally wrong to eat meat?" It is essentially a study of the ethics of eating meat. Although the main focus is on the use of animals as food, much of the discussion and reasoning is equally relevant to other uses of animals such as in scientific research. The author is a Senior Lecturer in philosophy at the University of Liverpool and his perspective is that of a moral philosopher. The book is an essay in practical ethics and is not written from a Christian viewpoint.

Frey examines the arguments which have been presented against eating meat. He identifies three basic arguments: those based on the claim that animals have certain rights which are violated; those which claim that it is wrong to kill animals; and those which claim that raising animals for meat involves pain and suffering which renders use of animals in this way unacceptable. In each case, Frey examines the nature of the arguments presented and finds them wanting. He suggests that arguments based on human responsibility for right behavior are more cogent.

Frey criticises the claim that animals have rights. He points out the difficulty of establishing the grounds for such rights which often seem to be based on intuition, self-evidence, obviousness, and appeals to "natural law." He suggests that appeals to rights are superfluous in ethics: that if we have a well-developed notion of right and wrong that is all we need in order to decide how to act. We cannot argue about rights with any degree of finality because we have no method for agreeing on how rights are to be established. Frey also argues that rights get in the way of the real issue (how shall we act) by focusing attention on speculative and abstract rights claims.

Rights, incidentally, have played very little role in Christian ethical thinking. Christians are enjoined to act in certain ways because God would act in those ways and we are to emulate God (e.g. "You shall be holy, for

I am holy." 1 Peter 1:16 RSV, quoting Lev. 11:45; or "Beloved, let us love one another; for love is of God, and he who loves is born of God and knows God." 1 John 4:7 RSV) or because God has directed us to act in certain ways: "So whatever you wish that men would do to you, do so to them; for this is the law and the prophets." Matthew 7:12 RSV.

Frey goes on to examine the claim that it is wrong to kill animals. He points out the difficulty of demonstrating this claim and reaching agreement, since we cannot even reach agreement on the taking of human life, as the debates on abortion, euthanasia, or capital punishment demonstrate. Our views regarding the killing of animals will depend on our views on the value of life and in particular on the relative values that we place on human versus animal life. Frey argues that basing ethical decisions on the value of animals (or other aspects of nature) are fraught with difficulties, since even if we agree that animals (or other natural things) have inherent value, it is not obvious that this leads to any particular moral imperatives.

The orthodox Christian view on the value of life is that animal life (and even plant life and inanimate matter) has value in God's eyes, but human life has much greater value ("Are not two sparrows sold for a penny? And not one of them will fall to the ground without your Father's will. But even the hairs of your head are numbered. Fear not, therefore; you are of more value than many sparrows." Matthew 10:29-31). The value of God's creation is vividly presented in the creation account of Genesis 1 in which God looked at the various parts of his creation and declared that it was very good ("And God saw everything that he had made, and behold, it was very good." Genesis 1:31 RSV).

The argument that the suffering of animals is grounds for vegetarianism is based on the observation that animals can and do feel pain, and on the claim that pain is an evil which must be eliminated, or at least justified. Frey suggests that the weakness of this argument is that if one removes the pain and suffering in objectionable animal husbandry practices, then one removes this grounds for vegetarianism. Clearly some methods of raising animals for food cause pain and suffering (e.g. e.g. confinement rearing of veal calves) which many people (meat eaters included) would like to see changed. However, this does not provide an adequate basis for the abolition of meat eating where there is no evidence of animal pain.

This book is well written, easy to read, and develops a cogent argument. The ethical force of the book is somewhat blunted however, since there is an implicit assumption that if there is a compelling argument in favour of a particular course of action, that people will follow it. I suspect that most people are less rational and more driven by their desires and emotions than Frey would like. Overall, however, I would certainly recommend this book to anyone interested in the ethical issues pertaining to animal rights, human use of animals, and vegetarianism.

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ESCAPE FROM GOD: The Use of Religion and Philosophy to Evade Responsibility by Dean Turner. Pasadena, Cal.: Hope Publishing House, 1991. 291 pages, index. Hardcover; \$17.95.

The author tries to convince us that the world, and in particular North America, is becoming more and more out of contact with reality, and is morally lost. After explaining what he means by object and subject, he continues to state that being alive means being a subject, having needs, longing. Man's longing for completion has arisen out of God's longing. Therefore God is incomplete, because God needs man to love him (p. 30, p. 48) and classical theists are wrong when they say that God is complete and immutable (p. 44).

In the second part of the book Turner wants to show how atheists, agnostics, classical theists, Augustine, Luther, Calvin, some philosophers, Eastern religions, Christendom, and Judaism take human responsibility away. The book then ends with chapters on the "myth of omnipotence" and the "myth of omniscience." The last chapter compares Gautama Buddha and Jesus. The word "sin" hardly appears in the book.

Turner's faith, and consequently his theology, is founded on rationality. Throughout the book, words like reason, logic, rationality, rational etc. abound. Turner uses his logic even against the Bible. For example, on pages 195-198 the infallibility of Psalm 16 is denied; Acts 17:25, Rev. 21:4 are criticized for the same reason. Turner cannot accept Rom. 13:1-2 and 1 Peter 2:13-14 (p. 212). Jesus' words about Satan and demons, if taken literally, make him into a Sadist (for good "reasons," p. 233). Thus it becomes almost impossible to discuss the author's theology on the basis of Scripture.

Turner says (p. 219): "It is understandable how people today may have their faith in miracles undermined, raised, as we are, in a public educational milieu oriented strictly around naturalism and logical positivism." I fully agree with this statement and I think that Turner's theology shows the influence of logical positivism as well.

If we depend on two-valued logic, we will come to the conclusion that the Bible as it is written contains contradictions. But then we forget that God is higher than we are and his reasons are not always understood by us. Listen to God speaking to Job starting at Job 38:2 with "Who is this that darkeneth counsel by words without knowledge?" See also 1 Cor. 13:9-12. Depending on two-valued logic and drawing conclusions out of statements of opponents often causes havoc in churches.

I will not discuss the Eastern religions and the philosophers mentioned. Unfortunately, they have a great and bad influence. Some indeed propagated self-interest as a guiding principle in life. But the fact that Turner appears to depend on a few sources only (no bibliography) makes me doubtful about the contents of these chapters.

Chapter 17 and 18 are not helpful at all. Chapter 17 on Judaism talks again about agnosticism and atheism as in chapter 8. Nothing is said about orthodox Judaism,

and thus the heading of the chapter is misleading. Chapter 18 on Christendom deals mainly with Augustine, Luther and Calvin. Turner deals extensively with the incorrect relationship between church and state and the atrocities committed by followers of these three persons. In my opinion that has little to do with lack of responsibility. If anything, it was taking too much responsibility on the part of the church.

Perusal of Calvinist creeds would have shown Turner that Calvinists do not deny responsibility for their sins, on the contrary: Jesus had to die for their sins. If one does not show gratitude by not living a life of loving God and neighbor, it disqualifies him from being called a Christian, Calvinists say. Turner accepts from the Bible only what fits in Turner's way of thinking. That, combined with taking "eternity" to mean "extended time" makes a discussion almost impossible. It reminds me of 2 Pet. 3:16.

Letters

Origins Discussions...

Recent contributions to *Perspectives* concerning the inclusion of intelligent causation as an alternative mechanism for the origin and modification of living organisms have been very interesting. I discern two basic positions. Raymond E. Grizzle's article (45:4, 222-228, December 1993) is one of several contributions arguing for the exclusion of God from scientific descriptions. I generally agree. The other position implies that Christian (and other) scientists should not ignore the option of an intelligent designer, such as God, as an alternative to modern scientific description. Should one favor a "God hypothesis" when it appears more probable, from a Christian perspective, than any available "scientific" hypotheses? Everyone fears the old "God-of-the-Gaps" thinking, but do modern scientists have an unwarranted phobia about it? Perhaps, but I'm not convinced.

I understand the frustration eloquently expressed by Phillip E. Johnson (45:1, 46-48, March 1993) and John L. Wiester (45:3, 182-186, September 1993) concerning the various meanings of the word "evolution." Indeed, that word must be carefully defined by the user because an anti-Christian world view is being wrongly purveyed as an inescapable implication of "evolution." Yes, we should insist that the unanswered questions concerning macro-evolution, which are many in number and major in importance, be emphasized. Alvin Plantinga (44:4, 258-263, December 1992) is certainly free to judge as weak the evidence that all contemporary living things are genetically related, and as an individual he can reject the theory of common ancestry without offering a naturalistic alternative. Maybe Charles B. Thaxton (42:4, 248-249, December 1990) is right to suspect that a strictly scientific case for intelligent design could be built.

However, most Christian biologists will continue to pursue the theory of common ancestry, just as they pursue, for example, the description of embryonic development based on genes and cellular structures. We still don't need to identify gaps in our scientific explanations in order to

Turner would have been wise to check his sources. Example: p. 202 quotes Taylor, who said that Calvin had a dispute with the Arminians. But Calvin died when Arminius was only four years of age.

The author uses throughout the book words like "pik-eristic," "brutalitarianism," "communizing," "atheizing," "catatonic," "immolative," "explainability," etc. These words do not help understanding. Some names are spelled incorrectly: for example, Groothius should be Groothuis; Schliermacher should be Schleiermacher.

It is clear that I do not recommend the book.

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

make room for God. The gaps are there, to be sure, and they are very big. In fact, I think the main problem with God-of-the-Gaps is not that some gaps get closed by science, but rather that we underestimate the enormity of the gaps. Our scientific (and philosophical, and theological, etc.) descriptions will always fall short.

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...and Origins Definitions

John L. Wiester in the September 1993 issue of *Perspectives* does us a service in drawing attention to the present-day situation in debates around the word evolution.

On a discussion between Gingerich and Phillip Johnson at the 1992 ASA Annual Meeting on "a point on which there was unanimous agreement," Wiester says: "The issue is not evolution versus creation. The issue is design versus accident." Of these two statements I have no quarrel with the first, but the second is highly suspect.

Why should chance (accident) not be a feature of God's world? Even humans on occasion construct machines that have chance built into their operation, and yet their overall purpose is achieved. Evangelical and other contemporary writers such as Donald MacKay, Arthur Peacocke and John Polkinghorne all accept chance as a feature of the creation. Are these people all wrong? If they are in fact right in their point of view that the world shows both chance and necessity, then clearly it is wrong to think that chance points to atheism and law to theism. Furthermore, if these writers are right, then it is Monod and Dawkins and others like them who are wrong. The issue is not design versus accident.

Looking back over history, Christians have often defended the indefensible. Cardinal Bellarmine was wrong in quoting scripture to show that the earth could not move,

whilst Galileo was right. Last century, in contrast to A. R. Wallace, both T. H. Huxley and Bishop Wilberforce were wrong in thinking that the mechanism of natural selection was opposed to Christian faith, which faith on the most fundamental level says that whatever way the world is, it finds not only its origin but also its very existence and sustenance in the God of biblical theism.

Gingerich's solution, as quoted by Wiester, is said to be the classic ASA policy that evolution should be taught as science, unaccompanied by a philosophy that is a naturalistic ideology (that is, I suppose, atheistic materialism or scientific naturalism.) The classic ASA policy is, I submit, correct.

Wiesters says the classic ASA policy has failed and wants to change it. He does this because, as he says, the present scientific power structure seems not to admit the classic ASA solution as permissible. Wiester produces a respectable set of exemplars of the present power structure, quoting Futuyma, Volpe at the first Science as a Way of Knowing Symposium, Dawkins, Gould, Sagan, the Royal Society of London, the biologists of AAAS as in project 2061, and Padian and other contributors to the 1990 Californian Science Framework. Nevertheless, however many voices advocate error, error does not thereby become truth.

What can we do with such people as Futuyma and the others, except confront them with sweet reason? At the least they should be able to see that the theist position is not unreasonable. And Christians have to acknowledge that atheism also has a right to exist even though it can not be deduced from Darwinism or neo-Darwinism.

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Distant Stars and Apparent Age

I was recently glancing through John C. Whitcomb's book, *The Early Earth* (Baker Book House Company, 1986) when I came upon the following sentence on page 60. In it, the author explained why we can see the recently created Andromeda galaxy, even though, at two million lights years distance, its light has not had time to reach us: "... its light rays were created by God already reaching the earth..." Now this thought is not at all new; it is a well-known assumption used to explain the fact that we can see the light from extremely distant astronomical objects even though not enough time has elapsed since their creation (roughly 10,000 years ago) for the light to have reached us. Though I had long understood this hypothesis, only now did its profound implications become apparent to me: I realized that, in observing distant astronomical objects, we are looking at structures that never really existed and seeing events that never really occurred.

An example will make this clear. In February 1987, astronomers in the Southern Hemisphere detected a supernova in the Large Magellanic Cloud. Named 1987 A, this Type II supernova was 160,000 light years distant and had as its progenitor star the blue supergiant Sanduleak. The evolution of this supernova has been intensively studied. In the context Dr. Whitcomb provides, what

strikes me as both particularly fascinating and important is that there never in fact was a supernova! What God obviously created some 10,000 year ago was either a black hole or a neutron star. (We will know with certainty when the "dust" clears.) The light from that initially created object will not reach us for another 150,000 years. It is clear that there never was a blue supergiant star named Sanduleak; it never exploded. The shells of expanding gas, the decaying isotopes and the reflections from distant nebula have no real physical existence. Every event of that explosion, along with everything else we see in the distant universe — including colliding galaxies, quasars, distant Cepheid variables and even our own galactic center — are merely part of a grand faux universe, a masterwork of trompe l'oeil from the creative mind of God, wholly imagined, yet wonderfully imaginative.

We have missed these implications inherent within the idea that "light is created in flight" because we have unthinkingly assumed that distant astronomical objects are merely faint points of palely colored, constant light. It is only when we realize that these "points" are neither points, nor pale, nor constant, that we begin to grasp the broader significance of the position.

A similar theory had been proposed in the past. In an attempt to reconcile a recent creation with what some scientists thought to be an appearance of great age of the earth, it was suggested last century that God had created a very young earth with the appearance of very great age. This proposal was rejected nearly universally by Christian scientists merely on the grounds that it was aesthetically unappealing. Besides, recent creationists maintained that the secular scientists had misread the geologic record; the earth not only is in fact young but, when properly understood, *appears* young, as well.

This belief that the earth appears geologically young is nevertheless a point upon which intelligent people may disagree. It is not altogether unreasonable to attribute the appearance of great age to at least some aspects of earth's geology. Since Dr. Whitcomb's position requires the overwhelming majority of the universe to have been created with the appearance of phenomenal (and supremely detailed) age, those who believe the earth appears young would not be compromising either their intellectual integrity or their beliefs by reconsidering their "young earth" interpretation of the geologic data.

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Correction on a Book Review

The book review section is one of my favorites in *Perspectives*. However, I would like to comment on a book review that appeared in the September 1993 issue. On page 207 of that issue, Jan de Koning reviewed Martin Gardner's "On the Wild Side." In the first paragraph of that review he cites Gardner as being a "philosophical atheist" and refers to page 114. In my copy of that book, Gardner says on page 114 that he is a "philosophical theist." The addition of the letter "a" by the reviewer seems to be more than a typographical error. It has biased the entire

review. As a result, I feel that review give an unfair perspective of the book and some kind of correction should be published.

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On Stines and Einstein

I am only just catching up with *Perspectives* for December 1992, and write with unqualified enthusiasm in response to J. W. Stines' paper "Time, Chaos Theory and the Thought of Michael Polanyi."

I wish to pass on a reflection in the form of a double limerick on "Einstein's response to Bohr and quantum theory" which occupies Stines' paragraph on page 226, and also Stines's note 24 which relates Thomas Torrance's (please note the correct spelling of his name) view that Einstein has been popularly misinterpreted. I presented my limericks to Professor Torrance at the Pascal Conference in Ancaster, Ontario in August, 1992. He seemed to be more concerned to defend "Bertie" than to look at the significance of the last line, which I regard as a gnomic representation of the theology of the loving self-emptying of God.

That theology seems consonant with a world view opened to us in Stines' paper which cannot rest easy with "certain certainties," which accepts an "a-rhythmic" reality exhibiting "strange attractors," and in which it is the very nature of God, as well as nature and history, "to take risks and ventures and to live by grace, which is to say freely" (Stines, page 225).

Herewith, the limericks, composed by me while studying at the Center for Theology and the Natural Sciences, Berkeley, Winter, 1989.

The Quantum Christ

*Said Albert, "I tell you now, twice,
good physics is balanced, and nice:
the Uncertainty Quantum
is certainly phantom —
I know now, God doesn't play dice."*

*Dear Bertie, you're tied to the mast,
a Ulysses who's bound to the past:
Our God does throw dice —
and it's scary, not nice —
that our God is the die that is cast!*

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On "The Big Crunch"

"Concerning the fate of the universe, gravity exists as a force pulling on the galaxies now hurtling out from the Big Bang, a force enormously determinative in the structure and operations of the universe, a force which will eventually pull all the galaxies back together." Such are the familiar contentions of many proponents of the "Big Crunch" theory, who have enjoyed an undeservedly high

degree of popular acceptance of their view, a degree resulting from their having made much use of a widespread popular misconception, Newtonian gravity.

But as Einstein and most modern physicists have contended, the geometry of curved space-time fully accounts for effects previously and erroneously regarded as caused by an attractive or pulling force (gravity). Therefore logically it follows that no "force of gravity" is pulling on the outrushing galaxies. I challenge any of your readers, including any physicist, to dispute this.

(Incidentally, why should scientists condone this situation in which, long decades after Einstein, probably over 90% of literate people believe that Newtonian gravity represents the soundest of scientific truths, enormously determinative in the structure and operations of the universe, when it is not a scientific truth at all?)

Suppose that it is fully and finally realized that only the geometry of the intangible curvatures of space-time will cause a "Big Crunch," if such an event is ever to occur at all according to natural processes. Then, all sorts of heretofore obscured, legitimate questions will surface to complicate and cloud the popular case for the "Big Crunch." For example, in connection with speaking of the bending of space-time sufficiently to cause cosmic expansion to reverse, leading eventually to the "Big Crunch," I submit that while matter in one part of the universe might be bending space-time in one direction, matter in other parts of the universe might be bending space-time in numerous other, non-collisional directions. Clearly matter can and does bend space-time in various directions, including directions which do not necessarily result in collision of matter, for space-time is in fact so curved in countless orbital patterns throughout the universe, including that of our own planet. So countless concrete examples exist which teach that the existence of even fully closed space-time curvatures does not at all necessarily mean that matter following such curvatures must end up colliding with other matter.

Also, I submit that, even if astronomers find 500 times the amount of matter so far detected, the universe might never contract, for space-time as a whole might well be curved independently of matter (as Einstein once postulated*) and might so exist curved in some distinctive way such as will never lead to contraction of the universe as a whole. (* *The Mysterious Universe*, by Sir James Jeans, page 73: "Einstein... imagined [space-time] to have an inherent curvature, besides that produced by matter...")

For many of us, the case for any "Big Crunch" remains considerably less persuasive than the case for a Big Bang universe which was created in the absolute sense by God about fifteen billion years ago and which will continue indefinitely to expand. (Of course I hasten to say that I do not view the physical galaxies as the final home of humanity, nor do I think that our physical universe is the only universe which has ever existed or will ever exist.)

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Vol. 36-38	(1984-1986),	Journal ASA	38,	284-288	(1986);
Vol. 39-41	(1987-1989),	Perspectives	42,	65-72	(1990);
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