PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

In this issue . . .

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

VOLUME 45, NUMBER 3

SEPTEMBER 1993

Perspectives on Science and Christian Faith

MEMBER EVANGELICAL PRESS ASSOCIATION

MANUSCRIPT GUIDELINES

The pages of *Perspectives* are open to any contribution dealing with the interaction between science and Christian faith in a manner consistent with scientific and theological integrity. Papers published in *Perspectives* do not reflect any official position of the American Scientific Affiliation.

1. All manuscripts (except Book Reviews) should be addressed to the Editor, P.O. Box 668, Ipswich, MA 01938.
2. Authors of *Papers* and *Communications* must submit **3 copies** of their paper for review purposes (an original and two copies).
3. Regular Papers should be accompanied by an *Abstract* of not more than 100 words.
4. All manuscripts should be typed double-space on good quality 8 1/2 x 11 paper (computer copies should be printed letter-quality).
5. References and footnotes should be collected at the end.
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.

REGULAR PAPERS are major treatments of a particular subject relating science and the Christian position. Such papers should be at least 10 manuscript pages in length, **but not more than 20 pages**. Publication for such papers should normally take 12 to 18 months from the time of acceptance.

COMMUNICATIONS are brief treatments of a wide range of subjects of interest to *Perspectives* readers. Communications *must not be longer than 9 manuscript pages.* Accepted Communications should normally be published in 9 to 12 months.

DIALOGUE offers the opportunity for brief and timely debate of relevant issues.

BOOK REVIEWS are an important part of *Perspectives*. They serve to alert the readership to books of interest and provide a valuable source for reference. Readers are encouraged to review books in their scientific fields which have implications for the Christian faith. To avoid duplication of reviews, prospective reviewers must notify the Book Review Editor of their intentions. Guidelines for book reviewers are available from the Book Review Editor and should be obtained before submitting a book review. *All reviews should be sent directly to the Book Review Editor.* The viewpoints expressed in the books reviewed, and in the reviews themselves, are those of the authors and reviewers respectively, and do not reflect an official position of the ASA.

LETTERS to the Editor concerning contents of *Perspectives* may be published unless marked not for publication. Any letter submitted for publication is subject to editorial review. Letters selected for publication will be published within 6 months.

ADVERTISING is accepted in *Perspectives*, subject to editorial approval. Please address inquiries for rates or further information to the Managing Editor. The ASA cannot take responsibility for any orders placed with advertisers in *Perspectives*.

PERSPECTIVES ON SCIENCE AND CHRISTIAN FAITH
(ISSN 0892-2675) is published quarterly for $25 per year by the American Scientific Affiliation, 55 Market Street, Ipswich, MA 01938. Telephone (508) 356-5656. Second class postage paid at Ipswich, MA and at additional mailing offices.
POSTMASTER: Send address changes to: *Perspectives on Science and Christian Faith*, THE AMERICAN SCIENTIFIC AFFILIATION, P.O. Box 668, Ipswich, MA 01938-0668.

The Graying of the ASA

The graying of America has not left the ASA unscathed. The impatient pace of those on the move is increasingly joined by a more measured tread — and an increasing number of third generation members. One tradition views cutting edge science as the province of the young. Does this tradition carry over to the activity of the ASA?

I would argue that the ASA can only fully serve its mission when all age groups are active. We need to attract younger students with the message that their faith and science should not be placed in separate categories, and challenge them to start the life-long task of building a world view. Working scientists can discuss the practical issues that stem from their work and join with others from various disciplines to grapple with enduring questions such as origins.

What can older members contribute? First, continued membership. Member fees and contributions provide the base for a unique evangelical ministry. Older members (hopefully) offer a more measured view on issues and can mediate in situations marked by impassioned rhetoric. Integrative thinking requires maturing — a long testing and sifting of ideas — a sense of history when dealing with the latest cosmology to hit the newsstand.

Older members can provide "timely" reviews and explore areas beyond their immediate disciplines. They can provide the organization to keep local sections alive. ASA has never suffered from the want of good ideas but has often lacked the infrastructure to carry them out. In short, the ASA needs a blend of youth and age which can articulate issues, educate the Christian community, witness to a wider community and engage in science-related ministry.

Keith B. Miller begins this issue by examining the theological implications of a "continuous creationist" position. He finds the relation of mankind to creation still largely ignored or subservient to economic interests. **George Murphy** then calls to our attention the distinctive contribution of the Holy Spirit to the natural world. He examines the role of the Holy Spirit in living things, the place of chance in natural processes, spiritual gifts, and cosmic sanctification. **Daniel J. Price** offers an analysis of recent interpretations of Freud's concept of the person. He finds "intriguing analogies" between theologian Karl Barth's anthropology and that of the post-Freudian psychoanalytical school of "object relations" psychology which views mankind as more than instincts and other biophysical factors.

John Weister's Communication challenges us to be precise and consistent in our use of the term evolution in the light of the prevailing assumption which views evolution as "outmoding any concept of design, meaning or purpose in the history of life."

Adam Drozdek closes this section by offering further comments on Bruce A. Hedman's earlier paper on Lutheran Georg Cantor's view of infinity, and **Sara Miles** leads the book review section with an essay review on Desmond and Moore's *Darwin* biography.

We are saddened to report the death of long time ASA member and Publications Committee Chairman Jim Neidhardt (July 15, 1993). His generous support will be sorely missed.

— JWH

Theological Implications of an Evolving Creation

KEITH B. MILLER

Department of Geology
Kansas State University
Manhattan, Kansas 66506

Insights into God's character and our creaturely responsibility are drawn from the scriptural account of the creation and from its preserved record on Earth. A "continuous creation" perspective has been taken that assumes a long physical and biological history of the Earth in which humankind has made only a very recent appearance. God is understood as intimately and actively involved in "natural, law-governed" processes, and nothing in creation is surrendered to a purely natural realm independent of God. The progressive, historical nature of God's creative activity is consistent with his redemptive work in the world and his sanctifying activity in us. The immense period of time during which life on earth evolved reinforces the inherent value of all life, which was created for God's pleasure and declared to be good. Our unique position as God's image bearers, possessing at once kinship with the non-human creation and with God, is the basis of a dominion over creation based on sacrificial service.

Much time, energy, and paper has been devoted to debate within the Christian community over how the Genesis creation accounts should be properly understood. One result of this debate has tragically been to divide and polarize the Church and divert its attention from its God-given mission to live as God's image bearers, exercising stewardship over his creation, and proclaiming his message of reconciliation to the world. There has similarly been a tendency to alienate the scientific community and ignore the implications of its growing understanding of the physical and biological world.

In the debate over the proper understanding of the Genesis account, most attention has seemed to focus on the scientific merits of various creation scenarios. What has largely been lacking in these debates is a consideration of the theological implications of these various interpretations for our understanding of the character of God, the relationship of God to his creation, and the relationship of us to the rest of creation. After all, it is to these basic issues that the Genesis account is primarily, if not exclusively, addressed. In addition, much of the resistance to evolutionary cosmologies among evangelical Christians is a perceived conflict with the fundamental doctrines of the faith. For these reasons, this paper deals directly with the theological implications of what I prefer to call the continuous creation view.

The term "continuous creationist" has been used by both Wilcox and Moltmann as a useful label for a fully theistic view of creation involving a long uninterrupted creative history.[1] My particular view is based upon the following propositional statements: 1) The intent of Genesis is not to provide information on the mechanism, sequence, or timing of God's creative activity. Rather, the intent is to proclaim the creator God over against the polytheism and idolatry of surrounding cultures.[2] 2) Scripture attests to God's direct involvement in the creation and continuing sustenance of the physical universe. 3) The physical universe provides a true and potentially understandable record of its creation. 4) The study of the universe has revealed its great age and immense expanse. 5) Science, especially biology and geology, is revealing a dynamic and progres-

sively unfolding physical and biological history of the Earth. This creative history includes human origins, which were confined to only the final moments of Earth history, and were inseparably connected to the creative processes operative in the rest of the physical universe.

This paper is an attempt to explore some of the theological implications of the continuous creation position outlined above. No attempt will be made here to defend or justify this position; it is simply presented as my beginning assumption. I am concerned that the Church will remain preoccupied with debating the scientific or scriptural merits of particular interpretations of Genesis without ever engaging the central issues about which the Genesis account is concerned. It is my hope that this paper will stimulate other Christians to consider the relevance of their own particular understanding of creation to their conception of God's character and his purpose for us and the rest of creation. Scientifically informed Christians need to begin to grapple with the increasingly pressing issues of resource depletion, environmental stewardship, and the appropriate use of technology before they lose their opportunity to have a voice.

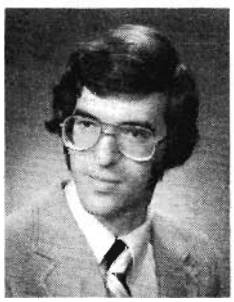
The Integrity of God's Creation

One of the fundamental assumptions of the continuous creation view outlined above is the integrity of God's creation — that is, the testimony of God's creation is true. This can be expressed in essentially the same terms as that of scriptural inerrancy — properly interpreted, the record of God's creative activity preserved in nature is true ("inerrant"). Worded in this way, emphasis is placed on the complementarity of the revelation of God's words and the revelation of God's works.[3] They are equally true expressions of the mind and character of God. As a result, the understanding of God, ourselves and the rest of creation obtained from the study of these two revelations must ultimately harmonize. The truths revealed by nature and scripture should inform each other, and any conclusion drawn from one cannot contravene that of the other.

Scripture attests to the truth of God's general revelation in creation. Creation is understood in scripture as the physical manifestation of the word of God — "For he spoke, and it came to be; he commanded, and it stood firm" (Psalm 33: 9).[4] Creation was a source of revelation on the character of God for the writers of both the Old and New Testaments. According to David, "The heavens declare the glory of God; the skies proclaim the work of his hands. Day after day they pour forth speech; night after night they display knowledge" (Psalm 19:1-2). Even more forcefully, Paul rests human accountability toward God on the universal proclamation of his creation — "For since the creation of the world God's invisible qualities — his eternal power and divine nature — have been clearly seen, being understood from what has been made, so that men are without excuse" (Romans 1:20).

I believe it is very important to recognize the works of God in the natural realm, his creation, as a source of truth about the Creator. Faith in a rational orderly God whose created works are orderly and comprehensible to those creatures in whom he invested his image is foundational to a Christian's practice of modern science. If the natural world does not contain a reliable record of its past history, on what basis can it be studied and to what purpose? Even more significantly, what would such a world communicate about the character of its Creator? Some argue that the geologic record was created by God as a test of our faith, and bears no relation to the true history of the Earth. The question, however, is not one of "faith testing," but of deception. God may, and does, command our obedience in the absence of knowledge, but I do not believe he ever gives us false information.

God's creation, as a revelation to his creatures of who he is, should provide an accurate record of



Keith B. Miller is a postdoctoral fellow in the Geology Department at Kansas State University. He is a graduate of Franklin & Marshall College (B.A. Geology), the State University of New York at Binghamton (M.A. Geology) and the University of Rochester (Ph.D. Geology). His research and teaching interests include stratigraphy, historical geology, and paleontology. While at Kansas, his research has focussed on cyclic sedimentation within the Permian, with particular emphasis on evidence for climate change. Keith was involved with InterVarsity Christian Fellowship throughout his undergraduate and graduate education, and is now active in the Christian faculty fellowship at Kansas State. His wife, Ruth, is a faculty member in the Electrical Engineering Department and is also an ASA member. Both attend the Evangelical Free Church of Manhattan, Kansas.

God's creative activity: of the way the universe actually was and is. Placed within this context, any "creation with age" scenario is untenable. I must dismiss the suggestion that God created stars with their light already reaching the Earth, or that the Earth records an apparent geologic history which never existed. Similarly, I cannot accept that God would have created organisms with apparent evolutionary relationships that have no existence in reality. Progressive change through time, whether in cosmology, geology, or biology is the overwhelming conclusion from a reading of the creation record. Such an understanding of God's creative activity eliminates entirely the problem of creation with age.

The rejection of apparent age does not imply the rejection of creation *ex nihilo*. That is precisely the dilemma which our present understanding of the history of the universe resolves. God created the universe from nothing, but that creation was progressive and of long duration rather than immediate and instantaneous. If all the physical universe can be traced back in time to a time zero, there is no false appearance of age. The universe is precisely as old as it appears. Before the beginning there was nothing but God. That may be a problem for the scientific community, but certainly not for biblical theists.

The integrity of creation upholds the trustworthiness of God's character. The God revealed in nature is the same God who has revealed himself in scripture and in human flesh — that is, the God of history and the God of truth.

A true and potentially comprehensible record of creation affirms the meaning of both natural history and human history. Christianity is fundamentally a historical religion, and our understanding of God is based on his historical interaction with his people. Human history flows backwards seamlessly into natural history, and anything which brings into question the validity of the latter threatens also our confidence in the former. As stated by Menninga, "... if we accept the concept of 'apparent age,' we are left with no assurance of the reality of any history whatever."[5] The integrity of creation upholds the trustworthiness of God's character. The God revealed in nature is the same God who has revealed himself in scripture and in human flesh — that is, the God of history and the God of truth.

The Enormity of God's Creation

The scientific enterprise has vastly expanded our view of the universe. In contrast to the world of the ancients, the cosmos we now inhabit stretches out in space to unimaginable distances and is populated by innumerable other worlds. Earth orbits an enormous sphere of incandescent gas on which rage magnetic storms that dwarf Earth in size. But our sun is only a rather average star, one of millions of stars in a rather average galaxy, which is one of billions in the universe. We share the universe with a bewildering array of other celestial bodies including newly forming stars in vast clouds of interstellar dust, stellar nebulae, neutron stars, pulsars, black holes, quasars, and exploding and colliding galaxies. The formation of these fascinating objects is imbedded in a cosmic history that stretches back in time perhaps 15 billion years. Over that vast time stars have formed, burned, and died, producing in the process the elements of which Earth and its living biosphere are composed.

Earth history, about 4.6 billion years, though only a fraction of cosmic history, remains beyond human comprehension. This history is also a highly dynamic one, more so than was appreciated even a generation ago. The Earth's crust has been in continual motion with the opening and closing of ocean basins and the collision and rifting of continents. Mountains the height of the Himalayas have been uplifted, eroded to sea level and uplifted again. The oceans have risen to flood the continents, retreated and flooded again to form repeated cycles of terrestrial and marine sedimentation. Global climate has varied considerably with at least five major periods of extensive continental glaciation. Superimposed on this complex array of physical and environmental change is the unfolding evolutionary history of life extending back over 3 billion years.

Our continually developing scientific understanding of cosmic history, rather than being seen as reducing God to some distant and irrelevant "first cause," should produce awe at God's incalculable power and wisdom. It adds a dimension to God as Creator and Lord of heaven and earth which could not even have been imagined by previous generations. The God whom we worship exerts his creative power over distances so great that light requires billions of years to traverse them, and the God to whom we pray has actively molded and directed his creation for billions of years. When God sought

to communicate his transcendence, power and authority to Job (Job 38-41), he instructed Job to contemplate the created universe. When we contemplate the universe today should we not, even more than Job, be overwhelmed by God's greatness?

One particularly subtle and destructive tendency we all have is to reduce our image of God to something easily comprehensible and manageable. We want to put our God in a box, where he is predictable and operates within well-defined boundaries. Our God is often much too small and we much too large. In his book *Your God is Too Small*, J.B. Phillips states that to see the size of God is to

> ... see the immensely broad sweep of the Creator's activity, the astonishing complexity of his mental processes which science laboriously uncovers, the vast sea of what we can only call "God" in a small corner of which man lives and moves and has his being.[6]

For all those who recognize a Creator, one look at the vastness and complexity of the universe should shatter any illusions that God can ever be enclosed by the constructs of our minds.

The incomprehensible vastness of the universe, while forcing us to face our smallness, also emphasizes God's grace in making us his image bearers and calling us into fellowship with himself.

The immensity of the universe in space and time emphasizes, in the most striking way, humankind's creatureliness and smallness. In comparison to the physical universe which science seeks to know, we are utterly insignificant. Though living within a universe much smaller than ours, David could say "When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is man that you are mindful of him, the son of man that you care for him?" (Psalm 8:3-4). Yet David did not stop there but continued: "You made him a little lower than the heavenly beings and crowned him with glory and honor. You made him ruler over the works of your hands; you put everything under his feet..." The incomprehensible vastness of the universe, while forcing us to face our smallness, also emphasizes God's grace in making us his image bearers and calling us into fellowship with himself. Beyond all expectation and possibility, God has chosen to love us and identify with us.

The Immanence of God's Creative Activity

A common, unstated, but implicit assumption which pervades the "creation/evolution debate" on both sides is that creation was an unique activity of God at the beginning of time. However, creation is not merely a past historical event, but a present and continuing reality! Scripture is firm in its declaration that all things are brought into existence and sustained by God's present creative activity. God is as much the author and creator of life (and of all physical reality) today as he was in the beginning. Scripture makes no substantive distinction between God's creative activity and his present sustaining of the universe. God gives life to all the creatures of Earth as a creative act: "When you hide your face, they are terrified; when you take away their breath, they die and return to the dust. When you send your Spirit, they are created, and you renew the face of the earth" (Psalm 104:29-30). Every creature, every human being is individually created by God. "For you created my inmost being: you knit me together in my mother's womb" (Psalm 139:13). It is this recognition that all life is dependent on the continuing creative power of God which has been somehow forgotten in the intensity of the creation/evolution debate.

God is immanent in creation—he is intimately and actively involved in what we perceive as "natural" and "law-governed" processes. The book of Job and Psalm 104 beautifully and forcefully communicate this immanence of God. Nature is not understood in scripture as something autonomous and independent of God's direct providential control. The sun rises and sets, the clouds bring rain to the Earth, and the hawk takes flight at God's command. God is no less involved in the normal events of our world than he is in the supernormal. As David Wilcox has stated:

> Anyone who is a fully biblical theist must consider ordinary processes controlled by natural law to be as completely and deliberately the wonderful acts of God as any miracle, equally contingent upon his free and unhindered will.[7]

Santmire has referred to this thoroughly orthodox understanding of God's providence as "omni-miraculous."[8] Though the western church in this scientific age may verbally assent to this understanding of God's providence, I fear that for most Christians

today it has little apparent significance or relevance. We have split the world into the physical and spiritual, the normal and the extraordinary, and then relegated God to the latter. No such dichotomy is apparent in the writings of scripture.

We have split the world into the physical and spiritual, the normal and the extraordinary, and then relegated God to the latter.

A biblical view of creation goes beyond God's continuous directing involvement in creation to his active upholding of creation, of reality itself, both physical and spiritual.

> For by him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things were created by him and for him. He is before all things and in him all things hold together (Colossians 1:16-17).

Nothing can claim co-eternity with God: he is the sole source of all reality. Though God is immanent in creation, he is not part of creation, but fundamentally distinct from it — he is transcendent.[9] Immanence without transcendence is pantheistic — and conversely, transcendence without immanence is deistic. These are two of the great errors of our time, and all times. It is the combination of these attributes which yields a biblical understanding of the Creator and God of history. God does not simply manipulate creation as though he were part of it, but upholds its very existence. Aquinas expressed this idea:

> We are not to suppose that the existence of things is caused by God in the same way as the existence of a house is caused by its builder. When the builder departs, the house still remains standing ... But God is, directly, by himself, the cause of the very existence, and communicates existence to all things just as the sun communicates light to the air and to whatever else is illuminated by the sun.[10]

Similarly, Langdon Gilkey states:

> ...without the continuing power of God, each creature would lapse back into the non-being whence it came. Were God to cease to be in things, they would simply cease to be .... For this reason, the concept of God's continuing creation of the world in each succeeding moment of its passage is the ground for the further doctrine of God's providential rule over each aspect of creation and each moment of its duration.[11]

The recognition of God's providential control over all of creation leads inescapably to a dualistic understanding of causation. A "natural" or scientific explanation of events, no matter how complete, does not negate God's complete control over those same events. There are thus two independent causal explanations that can be given for any physical or historical event.[12] Scripture presents just such a view. Behind all natural causes is the omnipotent hand of God. Rain or drought, plague or harvest, victory or defeat are all attributed to God's purposive action (see Amos 4:6 ff). The redemptive history of God's people is presented both as a series of cause-and-effect historical events, and as a direct manifestation of divine power. The death of Ahab by a randomly shot arrow (I Kings 22:17-38) is particularly illustrative. All events, even random ones, are under the direct control of God. Such a dualistic understanding is, in fact, the fundamental basis for our confidence in prayer. For example, though the formation of rain can be described as a consequence of a series of proximate "natural" causes, we can still pray for rain to end a drought, recognizing God's control and authority over those natural processes. It is peculiar that we implicitly recognize in our prayer what we otherwise frequently deny — that is, God's action is expressed in the everyday events of our world and our lives. We have bought into the "wisdom" of our time, cloaked in scientific authority, which states that natural causation excludes the divine. In this, the Church needs to find its prophetic voice.

The Progressive Nature of God's Creative Activity

The view that God's creative activity is instantaneous and transcends "natural" processes often springs from the larger view that God's power is evidenced only in the supernatural. This is often a subtle unspoken assumption which causes people to cling to the inexplicable and miraculous as evidence of God's reality. Mysteries of the natural world are seen as marks of the Creator's hand, while well understood natural processes are dismissed as not requiring the divine. This perspective is, interestingly, common to both the Christian and scientific communities. The result is a "God of the gaps" in human knowledge — God is seen where science and our own understanding fail. As our scientific knowledge grows larger, God's realm is correspondingly reduced. Faith is placed in a position of constant retreat from the "advance" of science, and continual

conflict is assured. This is a totally unnecessary state of affairs, since the action of secondary causes and divine action and control are not mutually exclusive.

The Creator gives his creation the freedom to participate in the accomplishment of his will, while he remains providentially in control and the sole source of power for this activity.

We find in scripture that God not only acts in the normal or "natural" events of our world, but also that he typically accomplishes his will through chains of secondary causes. In other words, God's activity is typically progressive in time, and potentially understandable in terms of cause-and-effect sequences of physical or historical events. The historical activity of God with his people is just that — history, with accounts of the rise and fall of kings and kingdoms, of alliances made and broken, of loyalty and treason, of bold acts of faith and great acts of wickedness, of prophetic voices heeded and ignored. But scripture views none of this history as occurring without the direct providential control of a God in whose hand the nations are but a drop in the bucket.

God's revelation of his character and his plan of redemption was a gradual one — first to Abram, then through Moses and the prophets to the nation of Israel, then through his own incarnation and the indwelling of his Holy Spirit to the world. Our own conforming to Christ's image is a process, even a painful one, not an instantaneous state achieved upon our conversion. God seems generally to deal through time more often than he accomplishes his will by "miraculous" intervention. He even commissioned us, his sin-warped creatures, to be the agents of his redemptive work. Efficiency is clearly not a priority in God's redemptive activity; why should we require it of his creative activity?

Even miraculous acts of God are often not without actual or potential physical description and explanation.[13] Many acts of God are understood as miraculous not because they break the continuity of cause-and-effect relationships but because of their spiritual context. They fulfill prophetic proclamations (Moses announcing the coming plagues to Pharaoh — Exodus chapters 7-11), occur in response to prayers of faith (Elijah praying for rain — I Kings 18), or demonstrate the authority of the Word of God (Jesus calming the storm — Mark 4:35-41). The incarnation itself, though clearly a miracle of the greatest dimension, involved natural processes. Jesus developed from a single cell in his mother's womb as any human infant, and after his birth he continued to "*grow* in wisdom and stature, and in favor with God and men" (Luke 2:52). That the infinite omnipotent God would subject himself to the process of growth and development seems more incredible to me than that he would use processes of gradual change in his creative activity.

Christians with a high view of scripture should not fear the involvement of secondary causes in God's creative acts. In fact, a progressive creative history involving secondary causes seems to me most consistent with God's providence and immanence in creation, as well as his transcendence over it. God is the source of all created reality but has given the physical universe a role in its own creation. George Murphy has spoken of this as "mediated creation *ex nihilo*," in which "God is the sole creator, but the whole material world has been produced mediately."[14] God thus affirms his creation, not only in its existence but in its dynamic activity. In a similar fashion God calls us to "continue to work out your salvation with fear and trembling, for it is God who works in you to will and to act according to his good purpose" (Phil. 2:12-13). The Creator gives his creation the freedom to participate in the accomplishment of his will, while he remains providentially in control and the sole source of power for this activity.

The Inherent Goodness of God's Creation

In the Genesis account, God looked upon what he had made and saw that it was good (Gen. 1:10, 1:12, 1:18, 1:21, 1:25). As expressed by the authors of *Earthkeeping: Christian Stewardship of Natural Resources*,

> These verses in Genesis 1 make clear that the goodness of creation is a goodness in the things themselves, not in their usefulness to humans — who are not even mentioned until the end of the chapter. To say that the goodness of creation is only a goodness of utility, because it can be used by the one creature made in God's image, is to miss most of the force of the boisterous and blossoming complexity of life which Genesis 1 suggests.[15]

God declared his creation good in its own right, exclusive of its good to humans. This realization

should provide a powerful motivation for environmental activism within the evangelical Christian community. That this is largely not the case suggests that the message of creation's inherent goodness has yet to be fully apprehended.

God declared his creation good in its own right, exclusive of its good to humans. This realization should provide a powerful motivation for environmental activism within the evangelical Christian community.

God loves and sustains all his creation, which exists for his pleasure and glory. In declaring his glory to Job, God asks rhetorically, "Who cuts a channel for the torrents of rain, and a path for the thunderstorm, to water a land where no man lives, a desert with no one in it, to satisfy a desolate wasteland and make it sprout with grass? ... Do you hunt the prey for the lioness and satisfy the hunger of the lions when they crouch in their dens or lie in wait in a thicket? Who provides food for the raven when its young cry out to God and wander about for lack of food?" (Job 38:25-27, 39-41). Here, as in the rest of Job, God glories in those aspects of his creation over which humans have no control, or about which they have no understanding. These exist for the praise of his glory alone, not for any human utilitarian purpose. The Psalms are likewise filled with images of all creation — the seas, the mountains, the hills, and all that is in them — giving praise to God (see Psalm 96, 98). This perspective is not unique to the ancient Hebrews, for Christ himself taught of the Father's love and care for all creation in his parables. Christ's argument for God's care of us would have no force if God did not really care for sparrows or lilies (Matthew 6:26-30; 10:29-31).

The developing modern understanding of the Earth and the cosmos gives added force and meaning to God's care and love of the non-human universe. A universe that extends in space for billions of light years, is a universe upon which only God can look and declare, "It is good." Innumerable worlds orbiting distant suns in our galaxy and countless others display their created beauty for God's pleasure and glory alone. The recognition of a creation history stretching back into the far distant past also emphasizes the inherent goodness of creation. Our present world is the culmination of billions of years of creative activity by God. A bewildering array of animals and plants have come into existence and passed into extinction during the long history of life on Earth. These creations of God were good and pleasing to God for their own sake — the appearance of humanity being a far distant event. Creation is indeed good, not because of some actual or potential usefulness to us, but because God made it so.

An ancient Earth with a long biological history implies the existence of physical death and pain before the Fall. This conclusion is inescapable. If the Fall did not bring death to the non-human world, then how are we to understand its effects on creation? I believe that the message of Genesis 3 is that the Fall destroyed the relationship of humans with the rest of nature, not that it fundamentally altered nature itself. The whole context of the creation account is a relational one — between God, his creation, and his image bearers. As Blocher states,

> It is permissible to think that the disruption affects that relationship before anything else, beginning with the weakening and disorder of man himself .... If man obeyed God, he would be the means of blessing to the Earth; but in his insatiable greed, in his short-sighted selfishness, he pollutes and destroys it. He turns a garden into a desert.[16]

We are the agents of nature's corruption.[17] The creation waits in eager expectation for our redemption (Romans 8: 18-23), for the restoration of its broken relationship with its divinely appointed steward.

It must first be realized that the creation God affirms in scripture is the present creation, not a pre-fall paradise.

Recognizing the consequences of human sin, the question remains: How can the presence of death and pain in the created world be reconciled with God's affirmation of the goodness of creation? It must first be realized that the creation God affirms in scripture is the present creation, not a pre-fall paradise. We are called to observe and ponder the creation surrounding us, and to respond with praise and glory to God. It is our familiar world with its lions, jackals and birds of prey to which scripture points us. Secondly, the study of nature reveals that death is woven into the very fabric of creation. Much of the amazing biological diversity of this planet is represented by carnivores and scavengers. This is especially true in the oceans, where nearly all mac-

roscopic organisms are carnivores. Ecosystems are built upon the flow of energy and matter through the food chain from plant to herbivore to carnivore. Through death and decay the elements necessary to life are recycled within ecosystems. Without death the divine blessing of fruitfulness would rapidly become a curse as available resources became exhausted. Continued reproduction is impossible in the absence of death. In short, death is essential for the continuation of life.

Death and pain need not be understood as satanic corruptions of the created order. Rather they reflect the nature of a God who has suffered and died for the life of his creatures.

The activities of reproduction, raising young, capturing prey, and defending against predators govern not only animal behavior and species interactions, but also their anatomy and physiology. Animals are *designed* for these very purposes.[18] The speed of the antelope and the fluid motion of a pursuing cheetah, the tender care of young in a herd of elephants, the beauty of an eagle as it plucks a fish from the water, the amazing protective camouflage of a walking-stick insect, the deceptive lures of the angler fish, the beauty of a spider web — all these call forth our wonder. Much of our marvel of creation is also in the intricate network of relationships between organisms which fit them into an incredibly well balanced system, a system where pain and death are inextricable parts. The beauty and goodness of the whole may seem to be at odds with the pain and suffering embedded within it. Perhaps we err in trying to impose our vision of goodness upon God. In this regard, William Dumbrell states "...our 'very good' world of Gen 1:31 was one in which the possibility of pain and suffering in the non-human world existed. Gen 1 thus is best viewed as presenting to us a picture of a world which corresponded *absolutely* to divine intention, but to which our abstract notion of perfection is not happily applied."[19]

Death and pain need not be understood as satanic corruptions of the created order. Rather they reflect the nature of a God who has suffered and died for the life of his creatures. Life from death — this is the biblical pattern and the pattern of creation. There is congruity here, not irreconcilable contrast. In the natural world life is created out of death. Life springs from the material of the dead, the Earth itself is formed of material created in the cataclysms of exploding stars. The image of resurrection is everywhere to be seen, and Murphy has captured its meaning in his term "chiasmic cosmology." He states,

> The multitude of death and resurrection types which are seen throughout the world of natural phenomena are then seen to be signs that the Crucified is the One through whom all things were made. On the other hand, the splendor of the galaxies flung across the universe, and the intricate biochemical bases of life, remind us that it is their Creator who is the Crucified. The cross and resurrection of Christ are the meta-sense of the world.[20]

That the God who became flesh and died for the life of his creatures should so design the world from its inception seems to me the most perfect of cosmic metaphors.

The Image of God in Creation

We are the image of God in creation — that is why the command against making graven images is so powerful. We stand in a unique position within creation — as God's representative, as his viceroy over the Earth. I believe that the basis for that unique position is our dual nature. We have at once a kinship with the rest of creation and with the Creator.

Genesis describes the origin of humankind in precisely the same manner as that of all other living things. In chapter 2, verse 7 it states "the Lord God formed man of dust from the ground, and breathed into his nostrils the breath of life..." Notice the wording in the following creative acts of God: "out of the ground the Lord God made to grow..." (v. 9), and "out of the ground the Lord God formed every beast..." (v. 19). The origin of our physical nature is not different from that of other creatures — we are made of the same stuff. If God used and providentially controlled evolutionary mechanisms in the creation of plants and animals, I see no reason to reject an evolutionary origin for humankind. In fact, the testimony of both scripture and nature is that we share a oneness with the rest of creation. Our physical natures are inseparably connected to the rest of life on Earth.[21]

Resistance to the acceptance of an evolutionary origin for the human species perhaps is due in part to pride. In denying our physical relatedness to the rest of creation, we are resisting the fact that we

are dust. What are we saying about our understanding of the natural world, and of God, if the suggestion of our genetic continuity with the rest of creation is considered incompatible with our position as God's image bearers? It may be that we have forgotten the goodness of creation, and the farreaching implications of the incarnation. God in Christ radically identified with his creation, he took upon himself human flesh and with that the substance of all creation. While we strive to forget our earthiness, God embraces it. Murphy emphasizes this point, and sees in it a powerful way of understanding the global significance of redemption in Christ. He states,

> God took on human nature to redeem it. And because humanity carries links of many kinds, embryological, structural, genetic and molecular, to the animals and plants of the earth, and indeed to the very dust of which we are made, God has assumed all that in the Incarnation.[22]

By taking upon himself the dust of the Earth, he is able to redeem the whole creation. "All things" are to be reconciled in Christ (Col. 1:20).

What are we saying about our understanding of the natural world, and of God, if the suggestion of our genetic continuity with the rest of creation is considered incompatible with our position as God's image bearers?

While Genesis roots our physical origin in the stuff of the Earth, it also places us firmly in a unique position before God and creation. The error is to attribute unique status to our physical nature, as though our exalted position is founded on something other than God's grace. I believe that it is our relationship to God more than anything else which distinguishes us. From the dust of the Earth God had raised up a creature and imparted to it a spiritually conscious soul. By this act of grace God elevated humanity to a special position of conscious and willing fellowship with himself.[23] This view is similar to that recently expressed by Clouser, who states:

> For it is clear in [the Genesis] account that what defines a human is being in the image of God, and that an essential part of that image is the capacity for fellowship with God. In short, humans are essentially *religious* beings. They are beings created for the very purpose of entering into covenant fellowship with their Divine Creator.[24]

This is not to say, however, that our physical bodies have nothing to do with being images of God. On the contrary, it is only as integrated physical and spiritual beings that we can properly image God to the rest of creation.

Our physical unity with the natural world is as vital to our appointed role as image bearers as is our spiritual apprehension of the divine.

An inseparable part of being created as images of God in the world is the authority delegated to us by God. We have been chosen out of creation as God's representatives, his stewards.[25] God commissioned us to "Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish of the sea and the birds of the air and over every living creature that moves on the ground" (Genesis 1:28). Adam was placed in the garden "to work it and take care of it" (Genesis 2:15). Our ability to exercise this divine commission to rule and care for creation is, I believe, based on our dual nature. Our physical unity with the natural world is as vital to our appointed role as image bearers as is our spiritual apprehension of the divine. As the authors of *Earthkeeping* state,

> ...in Genesis 1 and 2 humans are described as *being* two different kinds of things: *a part of* nature and *apart from* nature; likewise, they are described as *doing* two different things: *ruling* nature and *serving* nature .... one way to harmonize this apparent paradox is to recognize that it is only by virtue of human separation from nature that they can serve, and that it is the ability to be consciously a part of nature which enables them to be its legitimate master.[26]

An understanding of the meaning of our dominion as images of God must be based on scripture. The Church, however, has too frequently adopted the world's view of dominion — that is, demonstrated power and self-interested exploitation. We have too often treated creation as an enemy requiring forceful control or an inexhaustible resource to be used for our pleasure. The biblical view of dominion, in stark contrast, is one of sacrificial service. The Old Testament model of rulership is that of a be-

nevolent king who rescues the oppressed and has compassion on the needy, weak, and afflicted (Psalm 72:2-4, 12-14).[27] As Christians, our model must be that of Christ, into whose image we are to be conformed (II Cor. 3:18). And Christ exercised his divine authority as a servant, in compassion and humility.

> Your attitude should be the same as that of Christ Jesus: who, being in very nature God, did not consider equality with God something to be grasped, but made himself nothing, taking the very nature of a servant, being made in human likeness. And being found in appearance as a man, he humbled himself and became obedient to death — even death on a cross! (Phil. 2:5-8).

This is the model of dominion that we have for our rule over the non-human creation!

The application of Christ-like rule to our dominion over the rest of creation is truly radical, for it opposes the human-centeredness and materialism of our society. In his book *Imaging God*, Douglas Hall states,

> As [Christ] represents for us a transvaluation of almost every other value our frenetic society teaches us to cherish — the values of possessing things, of achieving mastery, of acquiring preeminence among our peers, of winning — so with the same disconcerting logic he pulls us back from the false ambition of being nature's "lords and possessors."[28]

The implications of the cross extend far beyond the forgiveness made available to us in Christ's substitutionary death. Christ calls us to take up our cross, to deny ourselves and live sacrificially in the service of others. Douglas Hall asks,

> What can the powerful of this world make of the dominion of a weeping Lord, a shepherd who lays down his life for the sheep, a donkey-riding king mocked, judged, and executed by the powers that were? And what would it mean for us to image the dominion of such a "king" in our life with the inarticulate creation?[29]

This question calls out for a response by the Church.

The recognition of our position as God's image bearers should make the Church a powerful force for environmental stewardship, yet the Church has remained largely silent. At the same time, the environmental movement is left without a philosophical foundation for its environmental concern. Outside of the biblical world view there is very little upon which to base an environmental ethic. Arguments for species preservation and environmental conservation ultimately devolve into utilitarian arguments (which give no intrinsic value to non-human species), or pantheism (which provides no basis for human involvement in the care of creation).[30] The answer lies in the goodness of a creation that declares God's glory, and in the service of his image bearers, appointed to rule it in sacrificial love. ❑

ACKNOWLEDGEMENTS

This paper has grown out of several years of personal meditation and discussions with thoughtful Christians, most of whom have differed with me on certain issues. I am very grateful for the support and challenge provided by fellow Christian graduate students at the University of Rochester as my thoughts on science/theology issues matured. The critical input of pastors and elders at several churches where I have worshipped has given me greater clarity of thought and communication. The comments of an anonymous reviewer are also gratefully acknowledged. I am especially indebted to my wife, Ruth Douglas Miller, who has been my greatest source of encouragement and my most thorough critic.

NOTES

[1] Wilcox, David L., 1986, "A Taxonomy of Creation," *Journal of the American Scientific Affiliation*, v. 38, pp. 244-250. Moltmann, Jürgen, 1981, *God in Creation*, Harper & Row, 320 pp.

[2] Charles Hummel makes this point beautifully.

> Genesis 1 achieves a radical and comprehensive affirmation of monotheism versus every kind of false religion (polytheism, idolatry, animism, pantheism and syncretism); superstition (astrology and magic); and philosophy (materialism, ethical dualism, naturalism, and nihilism). That is a remarkable achievement for so short an account (about 900 words) written in everyday language and understood by people in a variety of cultures for more than three thousand years.

(C.E. Hummel, 1986, *The Galileo Connection*, Downers Grove: InterVarsity Press, pp. 216-217.)

[3] To argue for the revelation of God through his works is not to say that particular features of creation provide specific illustrations of divine attributes or specific guidance for human behavior. Virtually any human behavior or philosophy can be justified by appeal to natural phenomena. We cannot pick and choose specific observations of the natural world to defend our theology. However, creation in its entire integrated wholeness must reflect something of the character of the One who continually sustains it by his creative power.

[4] This passage and all subsequent scriptural quotations are taken from the *New International Version*.

[5] Menninga, Clarence, 1988, "Creation, Time and 'Apparent Age'", *Journal of the American Scientific Affiliation*, v. 40, pp. 160-162.

[6] Phillips, J.B., 1961, *Your God is Too Small*, New York: Macmillan, p. 64.

[7] Wilcox, David L., *op. cit.*, p. 250.

[8] Santmire, H. Paul, 1985, *The Travail of Nature: The Ambiguous Ecological Promise of Christian Theology*, Philadelphia: Fortress Press, 267 pp. Santmire uses this term to describe Augustine's view of nature; Augustine stated:

> For who is there that considers the works of God, whereby this whole world is governed and regulated who is not overwhelmed with miracles? If he considers the vigorous power of a single grain of any seed whatever, it is a mighty thing, it inspires him with awe (p. 63).

[9] Luther has expressed this immanence and transcendence of God as follows:

> God is substantially present everywhere, in and through all creatures, in all their parts and places, so that the world is full of God and he fills all, but without his being encompassed

and surrounded by it. He is at the same time outside and above all creatures. (Quoted in Santmire, *op. cit.*, p. 129.)

[10] Quoted in Santmire, *op. cit.*, p. 87.

[11] Gilkey, L., 1959, *Maker of Heaven and Earth*, Lanham, Maryland: University Press of America, Inc., 378 pp.

[12] Thomas Burke, in a paper entitled "The Nature of God and Divine Causality" presented at the 1991 ASA Annual Meeting, argues that such a dual causation is a necessary consequence of a transcendent creator God.

[13] In the same paper cited above, Burke argues that God's activity in the world cannot be confirmed by scientific investigation because God is not a material being and does not act upon creation in a material manner.

> Rather, God's action will supervene upon the action taking place in the universe so that from the perspective of an observer within it a complete materialistic story can be told of those events. If God is providential in the traditional Christian sense, this must be the way things are, for he actually is constantly ruling over his creation. Miracles, then, will not be interruptions in the course of nature, the creation of gaps in the material sequence of events which composes the space-time continuum, but, as the New Testament expresses it, "signs" and "wonders" which cause men and women of faith to recognize God's salvific action "in" history, stand in awe of his majesty and grace, and respond in faith to his mercy and love.

[14] Murphy, George L., 1987, "The Paradox of Mediated Creation *ex nihilo*," *Perspectives on Science and Christian Faith*, v. 39, pp. 221-226.

[15] Wilkinson, Loren (ed.), 1980, *Earthkeeping: Christian Stewardship of Natural Resources*, Grand Rapids, Michigan: Wm. B. Eerdmans Publ. Co., p. 206.

[16] Blocher, Henri, 1984, *In the Beginning: The Opening Chapters of Genesis*, Downers Grove: InterVarsity Press, pp. 183-184.

[17] John Wenham makes this point when he states,

> It has been the sin of man, more than any other factor, which has sown discord in the world of nature, not only causing animal suffering and the destruction of plant life, but which now patently threatens mankind with self-destruction. Man's rape of the earth is a hideous and frightening story. Man was intended to live in partnership with the rest of creation, giving to it what he had to give and receiving from it what it had to give in return. But instead of trying humbly to learn God's laws and obey them, he arrogantly set out to exploit the world and to exploit his fellow-man.

Wenham, John W., 1974, *The Goodness of God*, Downers Grove: InterVarsity Press, pp. 204-205.

[18] The term "design" has deliberately been used here in connection with evolutionary origins. This is not to imply that evolutionary processes anticipate the future needs of organisms, or design them for some purpose or toward some goal. Rather, it is to emphasize the active involvement of God in the evolutionary process. God is the designer — evolutionary mechanisms, even random ones, are his instruments.

[19] Dumbrell, William J., 1985, "Genesis 1-3, Ecology, and the Dominion of Man," *Crux*, v. 21 (no. 4), pp. 16-26.

[20] Murphy, George L., *op. cit.*, p. 225.

[21] Murphy, George L., 1986, "A Theological Argument for Evolution," *Journal of the American Scientific Affiliation*, v. 38, pp. 19-26. Murphy emphasizes the significance of our evolutionary relationship with the rest of creation for the incarnation. In taking up human flesh, God also took upon himself all creation. In the cross Christ redeems not only us but all of creation.

[22] Murphy, George L., 1986, *The Trademark of God*, Wilton, Conn.: Morehouse-Barlow, p. 95.

[23] Such an understanding of human origins is not new. The biologist and Presbyterian theologian George Macloskie stated at the turn of the century, "Evolution, if proven as to man, will be held by the biblicist to be a part, the naturalistic part, of the total work of his making, the other part being his endowment miraculously with a spiritual nature, so that he was created in the image of God." Quoted in Livingstone, David N., 1987, *Darwin's Forgotten Defenders: The Encounter Between Evangelical Theology and Evolutionary Thought*, Grand Rapids, Michigan: William B. Eerdmans Publishing Company, 210 pp.

[24] Clouser, Roy A., 1991, "Genesis on the Origin of the Human Race," *Perspectives on Science and Christian Faith*, v. 43, pp. 2-13. See also the brief but thoughtful discussion of human beginnings in the introduction of Derek Kidner's 1967 book, *Genesis: An Introduction & Commentary* published by InterVarsity Press.

[25] Von Rad points out,

> The close relation of the term for God's image with that for the commission to exercise dominion emerges quite clearly when we have understood *selem* as a plastic image. Just as powerful earthly kings, to indicate their claim to dominion, erect an image of themselves in the provinces of their empire where they do not personally appear, so man is placed upon earth in God's image as God's sovereign emblem. He is really only God's representative, summoned to maintain and enforce God's claim to dominion over the earth (pp. 57-58).

From Von Rad, Gerhard, 1961, *Genesis: A Commentary*, Philadelphia: The Westminster Press, 434 pp.

[26] Wilkinson, Loren, *op. cit.*, pp. 210-211.

[27] See Wenham, Gordon J., 1987, *Word Biblical Commentary: Genesis 1-15*, Waco, Texas: Word Books Publishing, p. 33.

[28] Hall, Douglas J., 1986, *Imaging God: Dominion as Stewardship*, Grand Rapids: Wm B. Eerdmans Publishing Co., p. 193.

[29] Hall, Douglas J., *ibid.*, p. 194.

[30] See Van Dyke, Fred G., 1991, "Ecology and the Christian Mind: Christians and the Environment in a New Decade," *Perspectives on Science and Christian Faith*, v. 43, pp. 174-184.

Prayer for Today

Dear God:

Today we pledge our thoughts and deeds
to do Thy will, with our best self attuned to Thee.
Please grant us wisdom to suceed!
So let us say "Amen."

Arnold E. Reif

The Third Article in the Science-Theology Dialogue

GEORGE L. MURPHY

St. Mark Lutheran Church
Tallmadge, Ohio 44278

The science-theology dialogue has given little attention to the Holy Spirit and the Spirit's distinctive works. Reasons for this neglect, and for remedying it, are considered briefly. We then examine several areas of the dialogue in which insights from theology of the Third Article may be helpful: the importance of the Spirit for living systems, the role of chance in natural processes, spiritual gifts, and cosmic sanctification.

Until recently, the distinctively Christian understanding of God as the Trinity has not played an extensive role in the science-theology dialogue. As has been the case throughout much of the history of western theology, God's trinitarian character has been subordinated to the divine unity. Much of the science-theology dialogue has made use of an undifferentiated idea of "God," with little attention given to how an understanding of God as Father, Son, and Holy Spirit might contribute to the conversation. "God" often means in effect "God the Father,"[1] and since theology's interaction with science has often had to do with creation, the dialogue has been limited to issues addressed by the First Article of Christianity's ancient Creeds.

In recent years, however, the importance of Second Article concerns for the dialogue has been recognized, Teilhard de Chardin's emphasis on the relationship of evolution to christology being an important example.[2] Here I want to suggest that similar attention to Third Article concerns, the Holy Spirit and the Spirit's distinctive activities, may be beneficial.

The intent here is not to present a detailed theology of the Holy Spirit or of discussion of the place of such theology within trinitarian thought. The subject has some long-standing difficulties which it would be presumptuous to claim to be able to solve in a brief discussion.[3] Nor do I claim any definitive treatment of the issues to be considered. My goal is the more modest one of placing them on the agenda for the dialogue.

Some general trinitarian concerns do need to be mentioned here. For over a thousand years eastern and western Christians have been divided over the question of whether the Spirit proceeds "from the Father," as in the original Nicene-Constantinopolitan Creed, or "from the Father *and the Son*" (*filioque*), as in the western modification of the Creed.[4] This is of some importance for our present topic, for Eastern Orthodox theologians have argued that by making the Spirit dependent upon the Son, western Christians have effectively excluded a cosmic role for the Spirit. Eastern and western Christians are agreed that in the economic Trinity, the Spirit's mission *in the world* is "from the Father and the Son" and as the Spirit of the Son as well as of the Father (Gal. 4:6). The basic difference concerns the immanent Trinity (and the extent to which a distinction between economic and immanent Trinities is legitimate). But the Orthodox are right that, for whatever reasons, the cosmic role of the Spirit has been neglected in western Christianity. Many western Christians operate in practice with something like Origen's pre-Nicene concept:[5] The Father is active in all creation, the Son in rational beings, and the Spirit in Christians. Such a view hardly does justice to the biblical witness.

As we reflect on God's trinitarian activity in the world, we need to keep within the bounds set by two ideas. One is summed up in the traditional phrase, "The external works of the Trinity are undivided." All three persons are involved in everything that God does in the world. This does not

mean that they are all active in the same way: The Father is involved in the redemption of the world, but the Father was not crucified.

On the other hand, the doctrine of *appropriation* expresses the fact that some works should be considered primarily in connection with one person or another. Thus the work of creation is associated with the Father, redemption with the Son, and sanctification with the Spirit. The three persons of the Trinity are not three interchangeable mathematical elements. To speculate, for example, that the Father or the Spirit rather than the Son could have become incarnate is to make the doctrine into a piece of theological algebra rather than an attempt to understand God's self-revelation in Jesus, who addressed God as *Abba* and who promised the Spirit to his disciples.[6]

This idea of appropriation has often been overemphasized to the detriment of the idea that all God's activity in the world is trinitarian. One practical reason for this has been the way in which catechisms have presented the Apostles' Creed.[7] It makes things more simple to be able to teach the First Article as having to do with the Father's work of creation, the Second with the Son's work of redemption, and the Third with the Spirit's work of sanctification. Anyone who has taught Christian doctrine in a parish will appreciate the need to make the idea of the Trinity understandable. But some care is needed to avoid a "division of labor" caricature. When we speak of "Third Article concerns," then, we must include the work of the Spirit in creation and redemption as well as the Spirit's "appropriate" work of sanctification (and the roles of Father and Son in that).

What then are areas of the science-theology dialogue in which such concerns may be important? Four will be suggested in the following discussion: the importance of the Spirit for living systems, the role of chance in natural processes, spiritual gifts, and cosmic sanctification.

"The Lord and Giver of Life"

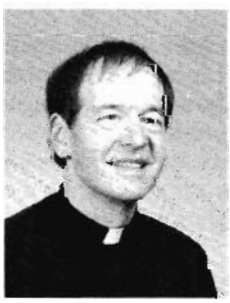
So the Spirit is called in the Nicene-Constantinopolitan Creed. In the Hebrew Scriptures spirit is *ruach*, which is also "wind" and "breath." All those connotations must be kept in mind for full appreciation of a passage such as Ez. 37:1-14, where the Spirit/wind/breath comes upon the slain to give new life. The creation of the first human in Gen. 2:7 is described as God's breathing "the breath of life" into dust, though the word *ruach* is not used there. This has sometimes been seen as a unique act of God which sets humanity apart from other animals formed from the earth (Gen. 2:19). But in Ps. 104:27-30, after speaking of humans along with birds, lions, and other living things, the psalmist says to God:

> These *all* look to you *[emphasis added]* to give them their food in due season; when you give it to them, they gather it up; when you open your hand, they are filled with good things. When you hide your face, they are dismayed; when you take away their breath [*rucham*], they die and return to their dust. When you send forth your spirit [*ruch^{a}kha*], they are created; and you renew the face of the ground.

The connection between spirit and life is also found in the New Testament, for example, in Jn. 6:63.

When the Holy Spirit is described in the Creed as "Lord and giver of life," there is no restriction to what is often called "spiritual life" (i.e., some special religious mode of existence) or even human life. In line with Ps. 104, God's Spirit is the giver of life, *period*.

For many people, "spirit" suggests an invisible but real part of a living organism, perhaps connected with the body but separable from it. In a more profound way, the word "spirit" refers to a living system's capacity to transcend itself. But another common use of the term is significant. We speak of "team spirit," or the spirit of a church or family.



George L. Murphy is pastor of St. Mark Lutheran Church in Tallmadge, Ohio. He received a B.S. and Ph.D. in physics from Ohio University and Johns Hopkins respectively, and an M. Div. from Wartburg Theological Seminary. He has taught physics and related subjects at Westminister College (PA), the University of Western Australia, Luther College, Loras College, and Wartburg Seminary. Publications include papers on relativity and cosmology, and articles on the science-theology interface. His book, The Trademark of God, *an adult course on evolution, christology, and creation, was published by Morehouse-Barlow in 1986.*

Here the spirit is the intangible "something" which connects and holds together different members of a group so that it is a single community and not just a collection of individuals. The life of each member of a group depends on that member's environment, and the life of the whole group depends on *its* environing reality. The spirit in this sense may be thought of as an "atmosphere" or "field" which makes life possible, a theme which Pannenberg has emphasized.[8] The reality of spirit means that the whole is more than the sum of its parts.

In the Trinity, the Holy Spirit is the Spirit *of* the Father and the Son. The Spirit is the personal love between the Father and the Son which unites them.[9] The three persons are *one* God, the *living* God, and the appropriate external work of the Spirit of God is to give life. Thus the Holy Spirit is the ultimately environing reality for all living systems.

The existence of dynamic order among parts of a complex system seems to be a basic feature of the things studied by the biological sciences. Electrons are not alive: the concept "life" does not even have a place in particle physics. Systems have to reach some degree of organized complexity before the property which we call "life" emerges.[10] It is not easy to describe this "emergence" — as distinguished from the individual physical and chemical processes — in a scientific way. But there *is* a connected whole which is more than the sum of its parts. If we are not too worried about using a religiously "tainted" word, we can say that what has emerged is "spirit."[11]

Here the spirit is the intangible "something" which connects and holds together different members of a group so that it is a single community and not just a collection of individuals.

In this sense, a bacterium as well as a human being has "spirit." In fact, the existence of life in the bacterium has some correspondence with the role of the Holy Spirit in the Trinity. This does not mean that the Holy Spirit emerges from lower forms of life. The emergence is part of the evolutionary process whereby God creates and makes it possible for the creation to share to some degree in the divine existence, and the appropriate mode of such sharing for living systems is spiritual. To speak of "degrees" here is to recognize that some forms of life are fuller than others. Human life is fuller than bacterial life with respect to their relationships with God, though from the biological standpoint they may both be adapted equally well to their environments. But in turn, Jesus says that he has come so that people might have more than "natural" life: "I came that they may have life, and have it abundantly" (Jn. 10: 10). And it is for this that what we regard as the peculiarly Christian gift of the Spirit is given in baptism (Jn. 3:5).

It should go without saying (but experience teaches otherwise) that I am not arguing that the doctrine of the Holy Spirit should be introduced into biological science. Biology, like physics, can operate "though God were not given."[12] Science can make sense of the world on the natural level, but by itself cannot discern any meaning or purpose in the overall order which it finds. Christianity claims that such meaning can be seen in the light of God's revelation, of which the gift of the Spirit is a part. The universe, including life, has an ultimate purpose, but that purpose is not something which science studies. On the other hand, the fact that living systems are to some degree spiritual does not mean that life is a "vestige of the Trinity," a clue from which we could deduce the existence or attributes of God independently of revelation. The argument must proceed in the other direction, from revelation to understanding of the theological significance of scientific results.

The Urim and the Thummim

One well-known passage about the Spirit is in John 3, where the evangelist, making use of the spirit/wind ambiguity of both Greek and Hebrew, has Jesus compare the Spirit with the unpredictability of the wind:

> The wind [*to pneuma*] blows where it chooses, and you hear the sound of it, but you do not know where it comes from or where it goes. So it is with everyone who is born of the Spirit [*ek tou pneumatos*]. (Jn. 3:8)

Until a few years ago this might have seemed to involve an obsolete picture of the world. According to classical mechanics, it could be argued, the motion of the air can in principle be predicted if we know the initial state of the atmosphere and all the relevant forces with sufficient precision. Accurate long-range weather forecasting with computers did not seem impossible.

We know now that that view of dynamics was naive. The problem of predicting weather was in

fact one of the first in which it became clear that long-range results are very sensitive to initial conditions, and that very slight changes in initial data can result in qualitatively different temporal evolution. If, to use a now-common example, the flapping of a butterfly's wings in Asia can change the weather a few weeks later in New York, it is clear that Laplacian determinism is a pure abstraction. The rapidly growing study of what is now known (rather infelicitously) as "chaos" has grown from such examples. The physical world — even without considering quantum phenomena — is a good deal less deterministic than was once thought.[13]

The Bible shows no embarrassment about the fact that some things do happen "by chance," but sees the realm of chance phenomena as precisely one in which the will of God can be made known.

The world is to some extent open, and there is possibility for spontaneous phenomena which cannot be regarded as already present in earlier states of the system under consideration. Jenson has suggested that the Holy Spirit can be identified with this spontaneity of natural processes.[14] Among other things, this means that petitionary prayer, always something of a puzzle for a deterministic view of the world, is a real possibility.

We can then also think in new ways of God's involvement in *chance* phenomena. Theists have sometimes been unduly concerned, and atheists unduly elated, about indications that some things do happen "by chance." The Bible shows no embarrassment about this, but sees the realm of chance phenomena as precisely one in which the will of God can be made known. When the division of the land of Canaan or the choice of a successor to Judas are made by lot (Josh. 14:2, Acts 1:26), the idea is that God's will is shown in phenomena which human beings cannot predict. The same type of thinking, which of course is not peculiar to Israel, lies behind the somewhat mysterious "urim and thummim." These may have been two stones or other small objects marked in distinctive ways, of which the priest would draw one at random to answer "Yes or No" questions.[15]

In light of the special associations of the Holy Spirit with the development and maintenance of life and with the spontaneity of the world, the fact that evolution involves random processes takes on new meanings. The Darwin-Wallace idea of natural selection is that an environment acts as a kind of filter for variations among members of species. Those variations themselves are random, and the fact that selection is in terms of probabilities — some organisms are more *likely* than others to survive and pass on their characteristics to offspring — means that evolution involves chance in crucial ways.

Another probabilistic aspect of evolution appears when we consider the origin of life. Today we are nowhere near a satisfactory theory of chemical evolution, but we can say that the spontaneous emergence of protein-nucleotide systems under equilibrium conditions seems to be extremely improbable.[16] Results of non-equilibrium thermodynamics, such as enhanced autocatalytic activity and dissipative structures,[17] may result in higher probabilities, but the chances for emergence of simple living systems may still turn out to be quite low.

For it has to be remembered that there is nothing scientifically **impossible** *about the spontaneous emergence against fantastic odds of a protein from a prebiotic soup...*

The very slight probability for spontaneous evolution of life from non-living chemicals lies at one end of a spectrum of probabilities for natural processes, a spectrum which runs through higher probabilities for survival of a given species and fifty-fifty chances for rain tomorrow to virtual certainties such as "Within experimental error, the atoms of hydrogen in this sample will have an ionization potential of 13.6 volts." One way of expressing the Christian doctrine of creation is to say that God "concurs" with *all* such natural processes.[18] This would mean that claiming the Spirit's involvement in the low-probability emergence of life is not simply a "god of the gaps" idea. It is part of a total belief in the Trinity's activity in all natural *and scientifically describable* processes. For it has to be remembered that there is nothing scientifically *impossible* about the spontaneous emergence against fantastic odds of a protein from a prebiotic soup, anymore than there is about rain on a day when the best meteorological

techniques predicted only a 20% chance of precipitation. We know — or at this point think we know — the basic laws of physics relevant to those situations, and neither life nor rain violates those laws. But the laws of physics simply are not able to tell us with certainty which of the possible outcomes will be realized.

But if the real God is ... the God whose glory is hidden in the humiliation of the cross and whose characteristic activity is resurrection of the dead and creation in spite of the lack of creaturely possibility, then Gould's picture of evolution is the type of thing we might expect.

The basic theological problem with the "god of the gaps" approach is that it makes God a specialist who simply can do a few things that no one else can do, instead of God *Almighty* who actually does everything that happens in the world, but in a hidden way through concurrence with natural processes. We are not making any such error here. And in turn, the involvement of the Holy Spirit in phenomena of low probability, like the emergence of life, offers no proof of God's existence or activity because, again, the processes involved do not contradict known scientific laws. The atheist who wishes to can simply say, "Strange things do happen," though some may be made nervous by such amazing coincidences.

The activity of the Spirit in random events often presents a threat to established structures and organizations. It results in "wild" behaviors, as when God's *ruach* came upon Samson (Judg. 14:6, 19; 15:14) and Saul (I Sam. 10:6; 11:6). The Nicene-Constantinopolitan Creed identifies the Holy Spirit as the One who "has spoken through the prophets," and the prophets of Israel were often the fiercest critics of established religious and political structures. Conflicts between "charismatic" and "regular" ministries have taken place in various ways in the Christian Church from the first century until the present.

That revolutionary role of the Spirit is also important for our theological understanding of the evolutionary process. Gould has argued forcefully, with particular attention to the remains from the early Cambrian in the Burgess Shale, that it is wrong to view evolution as a kind of Manifest Destiny of superior lifeforms.[19] Natural selection does not mean that the strange extinct animals of the Burgess Shale were intrinsically inferior to those which survived. They may simply not have been as lucky! There are serious limits to the extent to which any species could adapt to environments produced by global catastrophes such as asteroid impacts. If such catastrophes are significant factors in evolution, chance again plays a fundamental role in the development of life.

Of course many people, including Gould, see this as an argument against any kind of theistic design for evolution. We should agree in abandoning any belief in a traditional watchmaker God. But if the real God is the One described by the theology of the cross, the God whose glory is hidden in the humiliation of the cross and whose characteristic activity is resurrection of the dead and creation in spite of the lack of creaturely possibility, then Gould's picture of evolution is the type of thing we might expect.[20] The life-giving activity of "the Spirit of him who raised Jesus from the dead" (Rom. 8:11) is then a coherent part of this theological approach.

This does not mean that the Holy Spirit works against all types of order. Beginning with Paul's argument against uncontrolled glossolalia at Corinth that "God is a God not of disorder but of peace" (I Cor. 14:33), the Church has had to resist Enthusiasm, and it is clear that the evolutionary process has led to high degrees of order. But this order seems to be of the type of dissipative structures which we have already mentioned, and from the theological point of view we can describe the Body of Christ, evolution's future, as the ultimate dissipative structure.[21] Its head is the Crucified, and it lives from the cross. Thus it should not be surprising that its order is not that which common sense expects.

Spiritual Gifts

Paul's listing of gifts (*charismata*) of the Spirit in Rom. 12:6-8 and I Cor. 12:4-11 & 27-31 has evoked a good deal of discussion. His point here is that all Christians have spiritual gifts, and thus are "charismatics." Limited understanding of the range of the Spirit's operation has sometimes resulted in the idea that Paul is speaking here only of abilities which are important in some restricted "religious" area of life, or of gifts which are peculiar to Christians. It is clear, however, from examination of these listings of gifts, that most if not all of them have counterparts

outside the Judeo-Christian tradition. Many of these gifts have a considerable overlap with what are otherwise considered "natural talents" or abilities.[22]

An earlier passage about spiritual gifts is important for understanding the significance of science and technology. When the Tabernacle is to be built, God tells Moses (Ex. 31:2-6):

> See, I have called by name Bezalel son of Uri son of Hur, of the tribe of Judah: and I have filled him with divine spirit [*ruach 'elohim*, "the spirit of God" in margin], with ability, intelligence and knowledge in every kind of craft, to devise artistic designs, to work in gold, silver, and bronze, in cutting stones for setting, and in carving wood, in every kind of craft. Moreover, I have appointed with him Oholiab son of Ahisamach, of the tribe of Dan; and I have given skill to all the skillful, so that they may make all that I have commanded you.

Metal working and carpentry can thus be spiritual gifts.

God is, contrary to deistic ideas, continually involved in the world, and a proper trinitarian understanding then implies that the Holy Spirit is continually active in natural processes. What distinguishes some abilities from others as "spiritual" is not whether they are given by the Spirit or not but, paralleling Paul's spirit/flesh distinction, whether they are used in accord with God's purposes or contrary to them. The discussion of gifts in Eph. 4:1-16 points out that they are for the purpose of "building up the body of Christ" (v. 12). All abilities, including those for science and technology, have a spiritual character when they are directed toward the accomplishment of God's purpose for the world which is centered upon the body of which Christ is the head.

"The Spirit of the Lord has Filled the World"

The Book of Wisdom (1:7) thus speaks in the intertestamental period of a cosmic presence of God's Spirit. But we do not have to wait till such a late date to find this idea. At the beginning of the first creation account of Genesis we read that "the Spirit of God was moving over the face of the waters" (Gen. 1:2 RSV).[23] In the New Testament, Paul's statement of hope for the redemption of the whole creation, Rom. 8:18-25, is in the context of a discussion of the work of the Holy Spirit.

A theme which runs throughout Scripture, and begins at least as early as the texts dealing with the Tabernacle in the wilderness, is that of the *dwelling* of God. It is recognized that God cannot really be confined to any shrine (I Kg. 8:27), but there is the ongoing promise that God will dwell with his people. In the Johannine literature especially, Jesus is seen as the definitive presence of God in creation (Jn. 1:14) which replaces the Temple (Jn. 2:21), and the ultimate hope is that the dwelling of God will be with humanity (Rev. 21:3).[24] Through the Incarnation, the universe is to become the home of God. In the light of this idea, the presence of the Spirit in Gen. 1:2 can be seen as a "consecration of the cosmos."

What is unique about the Christian community is that its "community spirit" is the same as the Spirit of the triune community. It is the nucleus of God's new creation, made up of those who are the first to have the hope of becoming "participants of the divine nature."

To speak of this with another image which we have already introduced, the future of evolution is the Body of Christ. (Note the use of both of these images in Eph. 2:11-22.) And the spirit of this body, in the sense which we discussed above, is the Spirit of Christ, the Holy Spirit. What is unique about the Christian community is that its "community spirit" is the same as the Spirit of the triune community. It is the nucleus of God's new creation, made up of those who are the first to have the hope of becoming "participants of the divine nature" (II Pet. 1:4). All discussions of the theological significance of evolution and cosmology should eventually be put in this context.

It is important to emphasize that this eschatological activity of the Spirit, and our recognition that the Spirit is at work in this cosmic fashion, begin from the cross. When Jesus promises the gift of the Spirit at the Feast of Booths, the evangelist tells us that "as yet there was no Spirit, because Jesus was not yet glorified" (Jn. 7:39), which in the Fourth Gospel takes place on the cross. And when we are told that, on the cross, Jesus "gave up his spirit" (Jn. 19:30), this refers both to his death and to the gift of the Spirit, which is "made official" when he appears to his disciples on Easter evening (Jn. 20:22-23). There is no proper cosmic spirituality which does not begin from the cross.[25]

To speak of "consecration" and "spirituality" moves us into the realm of doxological language. It is a basic part of the Christian understanding of the Holy Spirit that those who receive the Spirit are led to prayer and worship. Doxological language may not be appropriate for science-theology dialogue with non-Christians, but Christian reflection on the work of the Spirit is distorted if this element is omitted. Christians do not simply talk *about* the Holy Spirit, but *invoke* the Spirit as the one who makes faith in Christ possible (I Cor. 12:3) and who gives any distinctively Christian understanding. For over a thousand years, one of the great hymns for such invocation has been the *Veni, Creator Spiritus* of Rhabanus Maurus, which is familiar to English-speaking Christians in Dryden's translation.[26]

Creator Spirit, by whose aid
The world's foundations first were laid,
Come, visit every humble mind;
Come, pour thy joys on humankind;
From sin and sorrow set us free,
And make thy temples fit for thee. ❑

REFERENCES

Biblical references are to the New Revised Standard Version unless otherwise noted.

[1] Such usage of course goes back to the fact that Jesus called "God" his "Father." St. Paul uses "God" in a number of trinitarian passages in which later theology would use "Father." The clearest instance is II Cor. 13:14.

[2] See, e.g., Pierre Teilhard de Chardin, *Christianity and Evolution* (Harcourt Brace Jovanovich, New York, 1969).

[3] George S. Hendry, *The Holy Spirit in Christian Theology* (SCM Press, London, 1957). Wolfhart Pannenberg, *The Apostles' Creed in the Light of Today's Questions* (Westminster, Philadelphia, 1972), pp. 128-178. Robert W. Jenson, Eighth Locus, "The Holy Spirit," in Carl E. Braaten and Robert W. Jenson (eds.), *Christian Dogmatics* (Fortress, Philadelphia, 1984), Volume 2, pp. 101-178. For a brief modern treatment from an Eastern Orthodox standpoint, see Emilianos Timiadis, *The Nicene Creed* (Fortress, Philadelphia, 1983), especially pp. 77-88.

[4] J.N.D. Kelly, *Early Christian Creeds*, 2d ed. (David McKay, New York, 1960), pp. 358-367.

[5] Origen, *On First Principles* (Peter Smith, Gloucester, MA, 1973), pp. 33-34.

[6] Robert W. Jenson, Second Locus, "The Triune God," in Braaten and Jenson (eds.), *Christian Dogmatics*, Volume 1, pp. 143-144.

[7] Luther's *Small Catechism* is a clear example of this. Luther was certainly aware of the trinitarian character of God's activity. See, e.g., his "On the Last Words of David," pp. 267-352 of *Luther's Works*, Vol.15 (Concordia, St. Louis, 1972), especially pp. 275-283.

[8] Pannenberg, *The Apostles' Creed*, pp. 133-136, and more recently pp. 162-167 of Wolfhart Pannenberg, "The Doctrine of Creation and Modern Science" in Ted Peters (ed.), *Cosmos as Creation* (Abingdon, Nashville, 1989). The latter reference gives some relevant background for the field concept.

[9] *Saint Augustine, The Trinity*, Volume 45 of *The Fathers of the Church* (The Catholic University of America Press, Washington, 1963), Book Fifteen, Chapter 17, pp. 491-496.

[10] For a brief biological discussion on the concept "life" see John Maynard Smith, *The Problems of Biology* (Oxford, New York, 1986), Chapter 1. Different ideas of emergence are presented in Michael Polanyi, *The Tacit Dimension* (Doubleday, Garden City NY, 1966), Donald MacKay, *The Clockwork Image* (Inter-Varsity, London, 1976), and Douglas R. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid* (Basic, New York, 1979).

[11] Edmund W. Sinnott, *The Biology of the Spirit* (Viking, New York, 1961).

[12] George L. Murphy, "The Paradox of Mediated Creation *Ex Nihilo*," *Perspectives on Science and Christian Faith 39*, 1987, p. 221.

[13] James Gleick, *Chaos: Making a New Science* (Viking, New York, 1987). John Polkinghorne, "God's Action in the World," *CTNS Bulletin 10.2*, 1991, p. 1.

[14] Jenson, Second Locus, "The Holy Spirit," in Braaten and Jenson (eds.), *Christian Dogmatics*, Volume 1, pp. 170-173.

[15] *The Interpreter's Dictionary of the Bible* (Abingdon, Nashville, 1962), s.v. "Urim and Thummim," I. Mendelsohn.

[16] Charles B. Thaxton, Walter L. Bradley, and Roger L. Olsen, *The Mystery of Life's Origin: Reassessing Current Theories* (Philosophical Library, New York, 1984), especially Chapter 8.

[17] I. Prigogine, *From Being to Becoming* (Freeman, San Francisco, 1980).

[18] See, e.g., Heinrich Schmid, *The Doctrinal Theology of the Evangelical Lutheran Church*, 3rd ed. (Augsburg, Minneapolis, 1961), pp. 677-692. A Reformed discussion is Benjamin Wirt Farley, *The Providence of God* (Baker, Grand Rapids MI, 1988), especially pp. 37-42.

[19] Stephen Jay Gould, *Wonderful Life* (W.W. Norton, New York, 1989). Gould's arguments have been criticized: for a popular discussion see Roger Lewin, "Whose View of Life," *Discover 13.5*, 1991, p. 18. These criticisms do not seem to me to have invalidated the basic thrust of Gould's argument.

[20] George L. Murphy, *The Trademark of God* (Morehouse-Barlow, Wilton CT, 1986).

[21] George L. Murphy, "Time, Thermodynamics, and Theology," *Zygon 26*, 1991, p. 359.

[22] Cf. Billy Graham, *The Holy Spirit* (Warner, Waco TX, 1978), p. 198: "I am not sure we can always draw a sharp line between spiritual gifts and natural abilities — both of which, remember, come ultimately from God. Nor do I believe it is always necessary to make a sharp distinction." He does go on to speak of "supernatural" gifts given for the good of the Church.

[23] The wind/spirit ambiguity allows *ruach 'elohim* also to be translated as "a wind from God" (NRSV). But it would be a mistake to suggest here that *ruach* is "wind" and *not* spirit. To do justice both to Hebrew thought *and* the setting of this phrase within the whole canon, it has to be remembered that mention of "a wind from God" also calls up the idea of "the Spirit of God." More problematic is the idea that *'elohim* here is a superlative adjective, so that one can translate *ruach 'elohim* as "a mighty wind" (NEB). For more extensive discussion see Brevard S. Childs, *Myth and Reality in the Old Testament* (Alec R. Allenson, Naperville IL, 1960), pp. 30-42.

[24] NRSV's choice of "mortals" to translate *anthrōpōn* is poor here since v. 4 says that "death will be no more."

[25] To say this in another way, the activity of the Spirit is always closely connected with that of the Word. Gen. 1:2 is followed immediately by Gen. 1:3!

[26] *Lutheran Book of Worship* (Augsburg, Minneapolis, 1978), Hymn # 164, verse 1.

JOURNAL OF INTERDISCIPLINARY STUDIES

An International Journal of
Interdisciplinary and Interfaith Dialogue

Nominated to the International Social Science Honor Society, 1991

VOL. V NO. 1/2 1993

The Unity of the Arts & Sciences:

PATHWAYS TO GOD'S CREATION?

Articles include:

David Grandy, The Musical Roots of Western Mathematics
Lynda E. Bair, The Art and Science of Medieval Manuscripts
John R. Zimmer, The Creation Story and Evolution
Robert Ensign, From Engineering to Apocalypse: Scientific Creationism as Literature
F. LeRon Shults, Integrative Epistemology and the Search for Meaning
Robert C. Bishop, Science and Theology
Also: Music Compositions, Book Reviews, Index 1989-93

* * *

Templeton Award for Best Paper on Science and Religion, 1992

Nominated as an entry for the Grawemeyer Award in Education, 1993

JIS *ISSN 0890-0132* is co-sponsored by the International Christian Studies Association and published by the Institute for Interdisciplinary Research, O. Gruenwald, W.R. Marty & T.J. Smith, editors. Refereed trilingual annual. JIS seeks to recover the lost unity of Renaissance learning while affirming transcendental values and faith. JIS VI (1994) on "Religious Resurgence in the Modern World: Social, Economic, and Political Implications" (Mss. due: *1 Jan. 1994*). JIS subscriptions: Individual: $15; Institutional: $25; Student: $10 (Overseas Air: add $5). Check/money order in U.S. funds drawn on a U.S. bank payable to: IIR, 2828 3rd Street #11, Santa Monica, CA 90405.

Discovering a Dynamic Concept of the Person in Both Psychology and Theology

REV. DANIEL J. PRICE

Pastor of the First Presbyterian Church
Eureka, California

In the past century and a half scientists have increasingly perfected their tools for the study of human persons. Little surprise, then, that the relatively new field of modern psychology has steadily grown in influence. Traditionally, there has been a good deal of animosity between modern psychology and Christian theology. This has been especially true of the psychoanalytic tradition begun by Freud and carried on by a number of his followers. Does this longstanding antipathy need to remain? Post-Freudian object relations psychology has developed from Freud's insights into the unconscious processes which influence human behavior. But object relations has, for the most part, rejected Freud's biological reductionism. Object relations theories have built upon Freud's foundational discovery of the importance of childhood, while pushing back the veil from the infant's relations to the parent. Could there be analogies here between what the object relations psychologists are uncovering and what the Bible tells us about ourselves? I propose that such is the case if one compares the theological doctrine of the person found in the writings of Karl Barth with certain aspects of object relations psychology.

> That the continued application of scientific methods breeds a temper of mind unfavorable to the miraculous, may well be the case, but even here there would seem to be some difference among the sciences. Certainly, if we think, not of the miraculous in particular, but of religion in general there is such a difference. Mathematicians, astronomers and physicists are often religious, even mystical; biologists much less often; economists and psychologists very seldom indeed. It is as their subject matter comes nearer to man himself that their anti-religious bias hardens.[1]

The above quotation by C.S. Lewis illustrates the extent to which he possessed powers of observation which were every bit as keen as his power of expression. But allow me to use his quotation to raise a crucial question. Why should it be the case that the closer the sciences get to "man himself," the farther they stand from religion? Some seem to not be troubled by this anti-religious bias of modern psychology. Yet I find it puzzling. If anyone cares to read the Scriptures carefully, they would not have to read far to see that the God to whom the Scriptures attest is far more often than not described in highly personal categories and metaphors. So personal is the God of the Old and the New Testaments that one might innocently expect to find that just the opposite should be the case. In other words, the nearer science gets to the study of human persons, the *nearer* it approaches God. There is little evidence for such a relation if we go back to Freud and study his instinctual theory of human personality. But could this relation begin to appear if we look at some of the theorists who departed from Freud? I believe so.

The anti-religious bias among the human sciences poses a problem for those who believe in both Christian revelation and the efficacy of the scientific enterprise. Unfortunately, all too little has taken place to change the unhappy impasse which Lewis describes. The tendency for science and religion to differ sharply over what it means to be human continues right to the present day. The problem

comes to a head where we discuss the relation between psychology and theology. If we can find between them no common grounds for what it means to be human, then the world of human sciences would remain severely cut off from the discipline of theological anthropology, and vice versa. This would perpetuate an unhappy dualism which separates spiritual from physical realities in a manner thoroughly unacceptable to biblical anthropology. For those who believe in the unitary nature of reality as provided by the Christian doctrine of the incarnation, it is only natural to expect that there would be certain analogies which disclose themselves as the theologian reflects upon revealed truth and the scientist seeks further understanding about the nature of human psychology.[2]

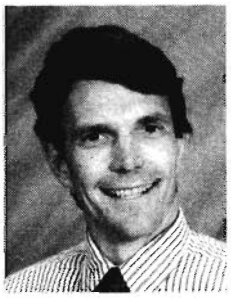
How have we arrived at the place where the scientists who study human beings are more commonly anti-religious than those who study the sun, moon, stars and atom? Could it be that certain philosophical assumptions about the nature of reality clouded the scientific investigations of the human person from the outset? Could it be that certain concepts were aggressively borrowed from physical sciences and applied to human studies without appropriate consideration given to the uniqueness of persons? Is it possible that Freud and other early psychoanalytical theorists borrowed concepts from the physical sciences which were themselves being challenged within the physical sciences at the very time Freud and other reductionists were borrowing them? I believe so. In fact, I would argue that it was precisely the bias toward a biologically reductionist understanding of the person which kept Freud and some subsequent psychoanalytical theorists from seeing the essentially relational nature of psychological development. However, Freud's theories were not only adopted — in many cases his successors significantly revised them. In Britain, psychoanalytic theories underwent a profound change as they became anglicized through the Tavistock Clinic in London, and further north in Edinburgh, Scotland in the theories of Ronald Fairbairn. On British soil the post-Freudian psychoanalytic theories of "object relations" were born. In certain strains of post-Freudian object relations psychology the reductionist blinders were removed. No longer could the instinct of sexual attraction be said to explain everything about human behavior.

I propose that there are some very intriguing analogies which can be found between Karl Barth's theological anthropology and the anthropology of the post-Freudian psychoanalytical school known as "object relations" psychology. I will develop my argument by beginning with the development of Freud's concept of the person.

The Evolution of the Concept of the Person in Freud's Theories

Freud began his inquiry about the nature of the human person as a scientist with a particularly strong anti-religious bent.[3] He studied in Vienna under Hermann von Helmholtz and Ernst Brücke, and was largely positivist and reductionist — greatly influenced by the laws of thermodynamics and exchanges of energy. Helmholtz had provided the mathematical formulation for the law of conservation of energy. Energy equilibrium would thus play an enormous role in all stages of Freud's theories.

So reductionist was Freud's early scientific training that he began in 1895, in his "Project for a Scientific Psychology" to reduce all emotional states of human beings to their neurological origins. (The essay was only published posthumously.) At first Freud was elated with his "Project," but, within a few weeks his elation turned sour, and he described the Project as "rubbish." Subsequent reflection had taught Freud that the workings of the human mind could not be directly correlated even to so complex and intricate a system as the human nervous system.



Daniel J. Price is an ordained minister in the Presbyterian Church (USA). He served as Associate Pastor for 8 years in Fresno, California, then worked with the Church of Scotland while studying in Aberdeen for his Ph.D. He then pastored the International Protestant Church in Zürich, Switzerland (1990-93) and as of August 1993 assumed responsibilities as Senior Pastor at the First Presbyterian Church of Eureka, California. His wife, Karen, is a clinical psychologist. They have two children: Michael, 8, and Heather, 4.

Finding synapses and neurons inadequate, Freud next believed that human mental functioning could be explained in terms of instincts. (If biochemistry won't do, then try biology.) Here is where Freud found a much more fitting key with which to unlock the human soul. Id, libido, sexual instincts: these were the reality of the human person and would soon reveal their patterns. Sexuality (*eros*), according to Freud, evolved through three distinct phases: oral, anal and genital ... (Later was added the aggressive instinct, or death wish (*thanatos*).) But Freud continued to push against the limitations of instinctual psychology — even though instinct provided the very bedrock of his psychological theory. Essentially, Freud asked why we don't act like "a gland" — that is, without inhibitions? Rape and murder were rampant in Freud's time, as always. Nevertheless, even when pure and unbridled, the instincts in and of themselves could not explain "everything." Ubiquitous as instincts may be, something restrains them. If instincts were not bridled, civilization could not exist.

Ubiquitous as instincts may be, something restrains them. If instincts were not bridled, civilization could not exist. [Therefore,] Freud realized that another reality must be present within the psychology of each individual.

Freud realized that another reality must be present within the psychology of each individual. Something must monitor the instincts. Hence, he theorized that the "self" or ego (*Ich*) provides some sense of control over the instincts. So, "ego" psychology began to develop. And yet the self was pitted against itself in a powerful manner: wanting to act out impulses which were nevertheless socially unacceptable. Hence the "super-ego" was what Freud named as the primary restraining agent, with the ego mediating between the super-ego and the instinctual impulses. Especially important to Freud was the Oedipus complex, with the develop of attraction to opposite sex parent and rivalry with the same sex parent.

Condensing Freud's enormous volumes into a few strokes, one could say that in the first stage of Freud's theoretical reflections neurology was the measuring stick of human behavior (c. 1900), in the second stage biology (c. 1900-1920), and in the third stage psychology (1920-1939). Freud arrived at the third stage by paying an increasing amount of attention to patient's dreams, guilt complexes, sexual-neurotic problems and feelings toward their parents, finally developing his famous endopsychic structural triad: id, ego and super-ego.

It was not isolated instincts, always seeking equilibrium, but real people interacting that were indispensable to Freud's most developed theory of the person.

Now it is important to note that in this third stage Freud began to take account of interpersonal human *relations*. It was not isolated instincts, always seeking equilibrium, but real people interacting that were indispensable to Freud's most developed theory of the person. The childhood relationship to the father was especially important for Freud (espcially around 4-5 years of age).

With post-Freudian psychoanalytical theorists like Ronald Fairbairn (and later carried on by others such as Heinz Kohut and Donald Winnicott), the idea of attraction being purely instinctual and sexual began to be questioned. Ronald Fairbairn asked whether it could be that *interpersonal attraction* is really the most compelling force in the human being, and that sexuality is merely one way in which attraction can be expressed?

Fairbairn, while acknowledging the seminal importance of libido theory, proposes:

> ... it would appear as if the point had now been reached at which, in the interest of progress, the classic libido theory would have to be transformed into *a theory of development based essentially upon object-relationships*. The great limitation of the present libido theory as an explanatory system resides in the fact that it confers the status of libidinal attitudes upon various manifestations which turn out to be *merely techniques for regulating the object-relationships of the ego.*[4]

While the distinction which Fairbairn is making sounds merely technical, it is an important one for psychoanalytic theory. Instead of libido, Fairbairn proposes to explain the human person on the basis the interactions between human persons. Fairbairn argues:

> My point of view may, however, be stated in a word. In my opinion it is high time that psycho-

pathological inquiry, which in the past has been successively focused, first upon impulse, and later upon the ego, should now be focused upon the object towards which impulse is directed.[5]

Object relations theory does not attempt to explain the person merely in terms of an impulse which resides within, but incorporates the fact that the foundational structure of a personality is always shaped within a social matrix.

The important thing about object relations theory for this discussion is that it incorporates a truly dynamic understanding of the person into its anthropology. It does not attempt to explain the person merely in terms of an impulse which resides within, but incorporates the fact that the foundational structure of a personality is always shaped within a social matrix.

In Fairbairn's view, none of the erotogenic levels is automatically or satisfactorily explained by itself, because even in Freud's theory raw libido could not explain itself; it only made sense as it bore the mark of an interpersonal relation (which, as we have seen, was mostly focused upon the Oedipus complex and its resolution). *This is why Freud was forced to posit the theoretical existence of such non-instinctual entities as the ego and super-ego: they represented a repository of the interpersonal conflicts which were impressed upon the individual during the resolution of the Oedipus conflict.* Fairbairn's theory of sexuality, however, depends upon successful object relations; it recognizes, but also transcends, the stages of erotogenic development defined by the instincts. Fairbairn infers: "Libidinal pleasure is not the end in itself, but the 'sign-post to the object.'"[6] Classical libido theory was built upon the false assumption of auto-eroticism, not object-eroticism.[7]

The differences here between Fairbairn and Freud signifies something about the human person which is highly significant. I believe they necessarily lead to two very different conclusions with regard to the nature of the human person. For Freud, the *sine qua non* of human existence was found in the instincts: component instincts which succeeded one another during the stages of psychological development. Everything that is constitutive of human ontology derived from the pleasure principle. In other words, human beings, for all their apparent complexities, are ultimately driven by their glands. For Fairbairn, the instincts are never an end in themselves, but always a means of either expressing or repressing an object relationship. In other words, glandular realities must be taken seriously,[8] but there is something deeper than a mere sexual attraction when one human being encounters another. Sexuality is one channel for the expression of human attraction, but there is an even more fundamental force at work than glandular drive when human beings interact.

Let us take for example the presenting problem of a 13 year old child who continues to suck his thumb. The thumb sucking is public and starts to become an embarrassment both to the child and his parents. According to Freudian theory, the child has arrested his sexual development at the oral stage. But an object relations approach assumes that there is from the start more than a misdirected drive. There is something amiss here with interpersonal dynamics which caused the child to seek oral gratification long beyond the time when such a type of practice is usually needed.

Object relations theory is an attempt to shift modern psychology ... from picturing the person as an organism seeking satisfaction, to seeing the person as a human being in search of meaningful relationships who uses various organs as means of seeking pleasure and also establishing such relationships.

Object relations theory is an attempt to shift modern psychology from an organic to a dynamic interpersonal model: from picturing the person as an organism seeking satisfaction, to seeing the person as a human being in search of meaningful relationships who uses various organs as means of seeking pleasure and also establishing such relationships. In normal human development the instincts are thus subservient to the forming of meaningful *relationships*. On the other hand, in Freud's psychoanalytic theory *relationships* are nearly impossible because all object relations are primarily the direct effect of the libidinal instinct.

Object relations theory therefore reopens the door for human beings to love and be loved, reintegrating the psychological factors into the somatic realities.

Now let us take the most influential theologian of the 20th century, Karl Barth, and look carefully at his theological anthropology.

The Person in Karl Barth's Anthropology

Like object relations, Barth's doctrine of the person is "dynamic." This of course needs further explanation, because the term "dynamic" refers to much more than the mere fact of material or physical motion. It applies rather to the uniqueness of an interpersonal encounter. The reality which comes into being in interpersonal dynamics is something which German speaking cultures refer to as *Begegnung*, "encounter."

Interpersonal Relationship as "History"

In order to further clarify what I mean when I describe Barth's anthropology as "dynamic," I present a study of Barth's usage of the important theological term "history." Barth gives the word "history" *(Geschichte)* a technical meaning. A "history" involves encounter: a relationship of one with an other. Barth explains:

> In contrast to the concept of history *(Geschichte)* is that of a state *(Zustands)*. There are states that are very much in movement, developing through many changes and varied modes of behavior. The conception of a stiff and motionless uniformity need not be linked with that of a state. But the idea of a state does involve the idea of something completely insulated within the state in question, the idea of a limitation of its possibilities and therefore of its possible changes and modes of behavior. It is never capable of more than these particular movements. Even the concept of the most mobile state is not therefore equivalent to that of history.[9]

Barth explains that a plant can have no "history," as such. It may grow, it may move and take in nourishment, and eventually die. But a plant has no history because it always functions within the fixed circles of change which are characteristic of its own state of existence. On the other hand, a history is introduced when something happens to a being at the deepest level which enables him or her to transcend his or her biologically determined orientation. Therefore, a history does not describe what happens when an entity makes changes intrinsic to its own nature, but only when some other being impinges upon an individual, eliciting a response. Barth reasons:

> The history of a being begins, continues and is completed when something other than itself and transcending its own nature encounters it, approaches it and determines its being in the nature proper to it, so that it is compelled and enabled to transcend itself in response and in relation to this new factor.[10]

This is a highly complex and difficult topic to grasp. Perhaps it is so difficult because we rarely think in terms of interpersonal relations, even when we study human persons. Our thinking about persons tends to be based on a somewhat crudely constructed Newtonian concept of ourselves. We tend to view ourselves as more or less autonomous billiard balls, bouncing into one another and exchanging momentum. But Barth's concept here goes much deeper: he argues that we actually influence one another on a deep ontological level when we encounter another human being. In other words, when one human being encounters another, something is called into existence which formerly did not exist.

Barth's anthropology, like the many anthropologies developing within the various strains of object relations psychology, is therefore "dynamic."

The Human Person as a Being in Relation to Others

And from what resources does Barth develop this "dynamic" theological anthropology? He derives in anthropology from Scripture — especially from his Christology.

Jesus, The Man For Others

As evangelicals, we have tended to focus mostly upon the divinity of Jesus. This is understandable, since the modern attacks upon the divinity of Jesus would tear the fabric of Christian faith in two, and render the Gospel merely something like a sentimental distortion written by grief-stricken first century followers of Jesus.

Nevertheless, the humanity of Jesus remains an equally important aspect of Christology. If we have tended to overlook the humanity of Jesus, it is — probably because we have tended to overlook our own humanity in modern life. Barth explores the facets of Jesus' humanity with unparalleled vigor.

In the humanity of Jesus, in his being as a man for others, Barth finds the basis of human encounter. Jesus was not first for himself, nor for a cause or ideal. Jesus was first and foremost a man for others. Barth says, "What interests him and does so exclusively, is man, other men as such, who need him and are referred to him for help and deliverance."[11] Therefore, in the life of Jesus we see the living embodiment of a man who is for others. Jesus is not properly understood in isolation. He is, rather, one who encounters his brothers and sisters. He lives "to them and with them and for them. He is sent and ordained by God to be their deliverer. Nothing else? No, really nothing else."[12] Jesus is otologically related to the human race. By this Barth means that Jesus could be no other than a man for others. He could not be indifferent and still be Jesus. His relation to others is not accidental, but essential and primary because it flows from the eternal love of the Son for the Father.[13] Jesus is not able to look upon human suffering and sin with stoical indifference; the afflictions of others affect him in his innermost being.[14] Jesus helps others not from without, or even beside, but from within, taking their place and creating something new from nothing. Jesus' being is both from and to his fellow humans. Barth says:

> If we see him alone, we do not see him at all. If we see him, we see with and around him in ever-widening circles his disciples, the people, his enemies and the countless millions who have not yet heard his name. We see him as theirs, determined by them and for them, belonging to each and every one of them. It is thus that he is Master, Messiah, King and Lord.[15]

Therefore, Jesus in his divinity is from and for God, and Jesus in his humanity is from and to his fellow "man" (*der Mensch*).[16] These are not at odds with one another but closely correspond. There is similarity between the divine and human in Jesus: hence the I of Jesus is determined by the Thou of God the Father, but also the Thou of his fellow humans. Jesus' being for God and for his "fellow man" are treated by Barth in light of the Chalcedonian formula regarding the two natures of Christ.[17]

The Heart of Trinitarian Anthropology: *Analogia Relationis*

Here we come to the inner core of Barth's anthropology. Barth's development of yet another technical term, *analogia relationis* ("analogy of relations") may one day prove to be his most lasting contribution to modern theology. We must, however, undergo a major paradigm shift with regard to classical conceptions of being in order to appreciate the significance of the analogy of relations.

Just as there is correspondence between the humanity and deity of Christ, there is also a correspondence between human love and divine love described as the *analogia relationis*. The *analogia relationis* is Barth's alternative to the Thomistic, *analogia entis* ("analogy of being") which supports so much of Catholic theology. In other words, Barth insists that if we are to talk about the human person in biblical terms, we must use the language of relations, not simply that of "being."

The need to shift theological thinking from being to relations may have some parallels in the scientific shift from classical physics to relativity and quantum theory. The concept of complementarity in microphysics presents an analogous problem to the question about being and becoming; how can a physical phenomenon like light have qualities of both a wave and particle?

Being and relations are simultaneous to one another. Being is inseparable from the relations which constitute any human person's existence.

The paradigm shift in Barth's thought is perhaps analogous to the shift in the new physics. Once the shift is made, the possibility that there could be a *being* which is apart from *relations* is nonsense, as is the notion that light must be either wave or particle, but cannot be both. Being and relations are simultaneous to one another. Being is inseparable from the relations which constitute any human person's existence: all of which relations are simultaneous, multi-leveled and complex.

Another analogy can be found in the discovery by microphysics that matter is inseparable from motion. When it comes to thinking about what makes human beings tick, our minds tended to run toward a kind of Newtonian understanding of motion in which external forces act upon distinct particles in absolute time and space. Yet the Newtonian paradigm holds true only within certain limited parameters of physical reality based on the classical physics. On the other hand, the more modern theories on the nature of light and subatomic particles are influenced by the dynamic thought of relativity and

quantum mechanics — and as such have a wider application. The Newtonian framework is not false, but fails to adequately describe the full picture. Might it be worth our time to probe for some analogies here? I think so.

Just as the basic building blocks of the universe have turned out to be best described as pulsating fields of energy, so the human reality may turn out to be best described as an encounter — or rather, a history of many encounters. There are thousands of encounters going on within the composite history of each individual human. There are the encounters with parents, then other or wider family, society and the world (including the natural environment). For Barth, the most important encounter is with God, then follows the encounter with others, self and time. All of this is Barth's way of interpreting what it means for human beings to be created in God's image and likeness.[18] In other words, we mirror or reflect God's dynamic character. Just as he is the triune God who encounters himself as Father and Son in the Spirit: performing mighty acts in the salvation of Israel, and ultimately encountering us through his Son, so each human individual is a being in becoming, a relation who by definition exists only as she/he acts in relations to God, self and others.

Just as the basic building blocks of the universe have turned out to be best described as pulsating fields of energy, so the human reality may turn out to be best described as an encounter — or rather, a history of many encounters.

Of course, the "encounter" which Barth describes applies, not to mere motion, but to interpersonal relations (there is an undeniable difference between all personal and impersonal realities). The point I wish to emphasize here is simply that we can no longer attempt to find out what something is by analyzing it in isolation from the things to which it normally relates. In physics, the further the physicist probes in trying to find the thing in itself, the more the basic qualities of the thing tend to be absorbed into a whole series of relations to other things. In similar fashion, but on an altogether different level, Barth has argued that the isolated self cannot be fathomed in and of itself. The true self can only be understood by apprehending the vital spheres of relations to which it belongs. We can see, therefore, why Barth would consider the solitary self to be living an unnatural existence, on conceptual as well as biblical grounds. Barth attacked the pronounced individualism of modern Western societies with a peculiar vigor.[19]

This dynamic anthropology is further explained by Barth's discussion about I and Thou.

"I Am As Thou Art"

The problem of self-conscious individual identity is expressed by Barth with the question: "What is meant by 'I?'" In speaking of "I" the individual does not only make a distinction, but also a connection. "I" does not make sense in isolation, but only in relation to "Thou." Here Barth once again employs the technical term "encounter" (which was developed by the Jewish philosopher and theologian, Martin Buber). Barth, however, makes some important modifications of Buber's I and Thou.[20]

In the logic of interpersonal encounter, human dialogue must take place between an I and a Thou. What does Barth mean by "I"? "I" does not make sense in isolation, but only in relation to "Thou":

> The declaration "I" in what I say is the declaration of my expectation that the other being to which I declare myself in this way will respond and treat and describe and distinguish me as something like himself ... Thus the word "Thou," although it is a very different word, is immanent to "I." [21]

For Barth, the I is relationally understood in the sense that the I always stands over and against the Thou. I is in relation to Thou, and I cannot say "I" without also saying "Thou." The self-sufficient I is an illusion, because, as Barth points out, even the concept or thought of I implies relation to another: to a Thou, who necessarily stands over against myself as I. The I and Thou are related because I stands over and against Thou — and only in distinction to Thou does I have an identity. In developing this interpersonal ontology, Barth takes issue with the isolated *cogito*[22] of Descartes:

> A pure, absolute and self-sufficient I is an illusion, for as an I, even as I think and express this I, I am not alone or self-sufficient, but am distinguished from and connected with a Thou in which I find a

> being like my own, so that there is no place for an interpretation of the "I am" which means isolation and necessarily consists in a description of the sovereign self-positing of an empty subject by eruptions of its pure, absolute and self-sufficient abyss.[23]

Therefore, the I is not absolute, but is defined both by distinction and connection with the Thou. The necessary relation between I and Thou is one of the chief descriptions of a dynamic anthropology. It is "dynamic" because it always entails the active relation of one person to another.

Barth: "Entering into this relationship, he makes a copy of himself. Even in his inner divine being there is relationship. To be sure, God is one in himself. But he is not alone. There is in him a co-existence, co-inherence and reciprocity."

We can now begin to see more clearly what Barth means when he refers to a dynamic anthropology. It is "dynamic" in the sense that it refers to a necessary relation between persons. It is important to see that Barth does not derive such an anthropology from anywhere else than from a theological foundation. Specifically, Barth derives his doctrine of the person from his understanding of the doctrine of the Trinity. Concerning God's being, Barth states:

> Entering into this relationship, he makes a copy of himself. Even in his inner divine being there is relationship. To be sure, God is one in himself. But he is not alone. There is in him a co-existence, co-inherence and reciprocity. God in himself is not just simple, but in the simplicity of his essence he is threefold — the Father, the Son and the Holy Ghost .... He is in himself the One who loves eternally, the One who is eternally loved, and eternal love; and in this triunity he is the original and source of every I and Thou, of the I which is eternally from and to the Thou and therefore supremely I. And it is this relationship in the inner divine being which is repeated and reflected in God's eternal covenant with man as revealed and operative in time in the humanity of Jesus.[24]

Because the relational nature of God is reflected in the humanity of Jesus,[25] and thus is the determination or destiny of every human person, it follows that the person who corresponds to, and reflects, the being of God (*analogia relationis*) bears the stamp of God's own dynamic character. Each human person then is destined to be in relation: to be I and Thou. I implies Thou, and Thou refers back to I. I and Thou are not coincidental or incidental but "essentially proper to the concept of man."[26]

Barth says this I and Thou is illustrated most succinctly in sexual polarity.

Some Similarities Between Barth and Object Relations Psychology in Their Concept of the Person

If we are searching for analogies between both Barth and object relations psychology, what do we find?

Being is Doing and Doing is Being

The first, and most important parallel between Barth and object relations is the emphasis each has placed upon interpersonal relations in constituting the person. Both Barth and object relations show how the person is shaped by a social context: by relation to an "other." In each case the person is defined not only by what mental faculties or instinctual energies an individual might have, but also by what the individual *does* — especially in relation to an other (or others). Both show, on their respective level of inquiry, how interpersonal relations are the fundamental building block of an individual's personhood; each individual person is shaped by their peculiar history of interpersonal relations.

In Barth's anthropology, relation to God is the primary relation. We might say that God is the primary external object. This relation has some important implications for the development of individual consciousness. It is only in the relation to God as an "object" (*Gegenstand*) that consciousness begins to develop: that cognition, volition and affection take on a valid existence.[27]

In object relations self-identity develops only within the history of complex social interaction. The child is born within a social matrix, and the self develops likewise. For Barth, of course, the social coefficient of knowing and being has a theological foundation. From Barth's theological perspective the social matrix of human personhood reflects the relational character of the triune God. God is a being who is in relation to himself: not just within the economic Trinity, but also within the immanent Trin-

ity. In other words: God does not pretend to be triune, nor become triune, merely to save us — he actually is a triune community eternally. This is one of the basic tenets of Nicene orthodoxy.

Therefore, the human person who reflects God's nature cannot be actualized as fully human apart from a right relation to the Creator, other creatures, self and time. Modern psychology, of course, cares nothing for the Christian doctrine of the Trinity. Since knowledge of the Trinity is knowledge which comes about only as a result of revealed truths, then it is outside the proper bounds of psychology. Nevertheless, we should not be surprised by our discovery of the striking analogies between theological reflections upon the biblical data, and a psychologist's reflections upon the data presented in early childhood relations to parents.

The Psycho-Somatic Unity of the Whole Person

The social development of human consciousness highlights another similarity between Barth and object relations: both insist upon the unity and integrity of the person as a whole, rejecting any dichotomies between body and soul, mind and matter, or psychological self (ego) and instinctual self (libido). The explicit holism of both Barth and object relations shows the extent to which both attempt to discover the unity of the theoretical and the practical person, the biological and the psychological. There is little that smacks of idealism in either anthropology. Their respective anthropologies are not merely derived *a priori* but give a good deal of respect to the empirical observation of the person's physical existence. On the other hand, neither fall into materialism. Rather than idealism or materialism, a deep seated realism runs through both the thought of Barth and object relations psychology. Barth's realism leads him to respect both the revealed nature of the person as it is interpreted in the person of Christ, and the physical existence of the person — which the Scriptures clearly indicate has an equal importance with the spiritual and psychological realities. Once again, the Trinity plays a major role in Barth's understanding of the person. This means that the incarnation of the Son must shatter the traditional categories which separated soul and body, instincts and reason: replacing them with a hearty affirmation of the dynamic interdependence of each with the other.

The psycho-somatic unity of the person has some very important implications for the relation between science and theology. It profoundly influences the ways in which we see ourselves both through the lens of modern science and that of faith. Listed below are some of the issues in need of further reflection.

A Dynamic Anthropology Breaks out of the Deterministic Mold

Barth's and object relations psychology's concept of the person are dynamic in the sense that the person is not construed as a closed system determined by antecedent causes and tending toward a state of equilibrium. They are dynamic in the sense that neither allows the reductionist criteria to stand. They are dynamic because the person in each case is open to an almost infinite variety of creative options in respect to their possible interactions with other persons. While certain patterns of human behavior can be observed within the field of interpersonal relations, there is nevertheless an overriding openness to the almost infinite variety of possibilities which obtain between human persons who engage in relations one to another.

Getting Beyond the Old Dualisms: The Hierarchical Structure of Reality

At the heart of biblical anthropology the Scripture is always concerned about the *whole* person in relation to God. Also, at the foundation of the modern human sciences and medicine a similar view is beginning to prevail. The endless and mostly fruitless speculations as to whether the biological or the psychological components are primary have begun to give way to newer paradigms which accept biological priority, and psychological supremacy. These paradigms are usually constructed upon models which reject both dualism and reductionism— arguing instead that reality is structured as a bidirectional hierarchy in which things are ordered according to their complexity — beginning with physical, and graduating upward to the chemical, biological, social, and psychological components. At the highest level, all the lower levels are not excluded, but included.[28] What makes the hierarchy bidirectional is that the components at the lower level have priority, while the higher level components exert a certain amount of control over functions at the lower levels.

These hierarchical paradigms have gained increasing acceptance in the human sciences. Yet they are mostly belated theoretical attempts to explain the practical death of anthropological dualism: a death which has been a self-evident fact of modern

medicine for many years. For example, do we not live in a world today in which increasing numbers of psychological illnesses are susceptible to treatment with chemical drugs? Do we not also live in a time when the psychosomatic origins of many physical illnesses have been revealed? Can we ignore the fact that highly sensitive instruments can register amazingly slight electrical impulses in the human central nervous system which correlate to certain emotions? There is, therefore, no going back to the naive but attractive notion that the psychical and somatic run down parallel tracks — as if they were simultaneously at a similar milestone but never intersecting one another and exerting a mutual influence. *If Christian anthropology continues to endorse anthropological dualism, to which it has traditionally adhered, it will find itself defending a position which is both scientifically untenable and biblically indefensible. Such a position which will continue to push many of the thoughtful people of our age headlong into either materialist or spiritualist monism, both of which have enormous shortcomings.*

In my view, Barth's anthropology presents a viable alternative to the prevailing dualistic anthropologies of most Christian theologians. These dualisms surfaced not so much from the biblical data itself as from the Hellenistic perspective which theology had largely adopted.

Dynamic Anthropology: Could It be Analogous to a Field Theory?

The employment of field theory in describing the relational nature of the person is advocated by T.F. Torrance. He comments on Clerk Maxwell's field theory:

> We must now take up Clerk Maxwell's concept of the *field* ... and not least the concept of relational thinking which he found, for example in the teaching of Sir William Hamilton. Evidence for this is apparent in Clerk Maxwell's 1856 essay on analogy where he showed that analogical resemblances and differences are embedded in the structural patterns of nature throughout the universe. Analogies are sets of relations which bear upon each other and point beyond themselves and thus supply us with fundamental clues for heuristic inquiry beyond the limits of empirical and observational knowledge. Hence, he claimed, "in a scientific point of view the relation is the most important thing to know." Clerk Maxwell insisted, however, that the relations he referred to were not just imaginary or putative but real relations, relations that belong to reality as much as things do, for the interrelations of things are, in part at least, constitutive of what they are. Being-constituting relations of this kind we may well speak of as "onto-relations."[29]

By inference then, Torrance is saying the same thing which Barth said above: a relation is not peripheral or incidental to human ontology but is constitutive of the human essence. This is what Barth has said on a theological level and what object relations confirms by its empirical studies of human psychological development.

Barth clearly stands within the stream of theological reflection which views the individual in terms of relations rather than isolated particles — which Freud's theories borrowed from the physical sciences of his day.

Torrance continues:

> In the Reformed theological tradition the notion of the person is held to be controlled by the person-constituting and person-intensifying activity of God in the Incarnation, such that union with Christ becomes the ground for interpersonal relations in the Church. Relations between persons have ontological force and are part of what persons are as persons — they are real, person-constituting relations.[30]

The relational structure of both Barth's and object relations' anthropology allows them to understand the person as a reality which is analogous to the modern field concept developed by Faraday and Maxwell.[31] The "field" is, according to Torrance, a better model for a dynamic anthropology than the more mechanistic terms which, for example, describe human persons as if they could be explained in exclusively in terms of instincts or other biophysical causes.

I have argued that both on a theological and psychological level, human persons are best described by their interpersonal relations. All of this has been in order to create a dialogue between the theological understanding of the person and the studies of modern science applied to human psychology. It is increasingly the case that when we study human persons in a modern conceptual framework that we study not only individuals in isolation, but also take into consideration the various relations which constitute their normal environment. Human persons are connected to the other living things in the world. In other words, each person is the recipient of certain biological, genetic, and social factors. Theological anthropology has for too long neglected the physio-biological realities of our existence, thus isolating

itself needlessly from the various disciplines which have a healthy respect for our physical realities. One strength of Barth's theological anthropology is that he considers the biblical data seriously, and breaks away from the exaggerated asceticism which maintained a firm grip on theologians from Augustine right up to the present. What makes us peculiarly human, according to Barth's interpretation of the Bible, is not the mere fact that we possess intelligent souls. Rather, we are chemical, neurological, biological and sexual creatures who are called into a unique relation to our Creator via the Redeemer. If in fact we are distinguished from the other creatures by our superior intelligence, it is only because intelligence itself is a dynamic event — teased out in relation to our Creator, our parents, society and the world.

We *are* indeed biological creatures who are connected to our parents and the world in which we live. However, we are connected to our ancestors and others by *interpersonal relations, not just by impersonal causes*. It is precisely where the relation enters in that we begin to reflect upon what it is that makes us peculiarly human. Christian anthropology can make its way forward in the 21st century if we will explore dynamic paradigms which attempt to integrate both the biological and the psychological-spiritual elements of what it means to be human. Such dynamic anthropologies are biblical, and perhaps they hold the promise of increasing the dialogue between theological anthropology and the human sciences. ❑

NOTES

1 C.S. Lewis, *God in the Dock*, p. 135.

2 See W. Jim Neidhardt, "Relational Disclosure: Analogies in Judeo-Christian Theology and Natural Science." 1991. p. 3f. (As yet unpublished to this author's knowledge.)

3 Freud was a gifted neurologist who entered the medical profession mostly because there were no research positions open in neurology when he graduated.

4 *Psychoanalytic Studies of the Personality*. London: Tavistock Publications, 1952. p. 31.

5 *Psychoanalytic Studies*, p. 60.

6 *Psychoanalytic Studies*, p. 33. Cf. Rom Harré, *Social Being: A Theory for Social Psychology* (Totowa, N.J.: Rowman and Littlefield, 1980), who says: "The deepest human motive is to seek the respect of others."

7 *Psychoanalytic Studies*, p. 34. The primacy given to inherent auto-eroticism applies primarily to Freud, of course. But it also applies to Freud's followers such as Karl Abraham. *Selected Papers of Karl Abraham* (London: Hogarth Press, 1927), p. 496.

8 It should be emphasized that object relations psychology does not overlook the biological realities of human existence, nor does it reject the importance of sexuality. Rather, it merely objects to the "reification of the instincts," as Donald Sutherland describes. See Fairbairn's *Journey into the Interior* (London: Free Association Books, 1989) p. 138.

9 *Church Dogmatics* (hereafter *CD*), III/2, p. 157f.

10 *CD*, III/2, p. 158.

11 *CD*, III/2, p. 208.

12 *CD*, II/2, p. 209. Barth cites Lk. 2:11, Dan. 7, Phil. 2:6f., 2 Cor. 8:9, Heb. 12:2; 2:14, 17f.; 4:15, as evidence that Jesus is a deliverer for humans.

13 *CD*, III/2, p. 210.

14 See Barth's word study on σπλαγχνίζεσθαι; *CD*, III/2, p. 211.

15 *CD*, III/2, p. 216. An interesting objection to Barth's emphasis upon the dynamic and interpersonal character of human personhood is that he overlooked the need for an individual to remain distinct from the group — as well as to be connected to it. On the level of everyday life, Barth was quite strongly individual, but might there be in his theology a tendency to overemphasize human interconnectedness at the expense of individuality — especially in light of Jesus' frequent withdrawal from the masses? See Mt. 8: 18, Mk. 1:35-45. This objection is worth considering — and yet, it could be argued, especially from the passages in the Gospel of Mark (which refer to the supposed "Messianic secret") that when Jesus withdrew from the masses he was actually seeking a deeper communion with, and guidance from, the Father. He was not necessarily seeking isolation for its own sake. The one moment of real isolation was the hell of the cross: "My God, My God, why hast Thou forsaken me?" Matthew 27: 46, Mk. 15:34. But, conceptually, neither should the individual be pitted against the group, as though they were exclusive. A genuine encounter is primarily defined by its capacity to enhance individual identity while at the same moment leading to communion, one with the other.

16 Rather than the term "man" (*der Mensch*), Barth sometimes uses the more inclusive term "cosmos," (*der Kosmos*) to refer to man and his historical setting. Jesus does not redeem man, understood abstractly, but man in the cosmos. See *CD*, III/2, p. 216.

17 Both the positive formulation of the Christological Councils (*vere Deus, vere homo*), and the negative adverbs describing the hypostatic union of the two natures of Christ (ἀσυγχύτως, ἀτρέπτως, ἀδιαιρέτως, ἀχωρίστως), have been employed by Barth to illumine the understanding of "real man." The Chalcedonian formula especially serves as a limit and guideline for Barth's Christological anthropology. Barth's affirmation that man is "soul of his body—wholly and simultaneously both, in ineffaceable difference, inseparable unity, and indestructible order," has *mutatis mutandis*, an unmistakable Chalcedonian ring to it.

18 See Genesis 1: 26-27.

19 See especially *CD*, III/2, pp. 319 ff. Cf. also, Barth, *Fragments Grave and Gay*, tr. E. Mosbacher (London and Glasgow: Collins, 1971), p. 99.

20 The language of I and Thou is sometimes referred to as "dialogical personalism." In his analysis of dialogical personalism, Wolfhart Pannenberg thinks that Barth is the evangelical theologian closest in thinking to Buber, especially in volume III/2 of the *Dogmatics*.

21 *CD*, III/2, p. 245.

22 "I think" — with the logical implication that therefore, "I am."

23 *CD*, III/2, p. 245 ff.

24 *CD*, III/2, p. 218.

25 Barth cites John 17: 5-21. He concludes that here "the divine original creates for itself a copy in the creaturely world." III/2, p. 221.

26 *CD*, III/2, p. 248.

27 It is important to clarify that Barth is not endorsing some sort of immediate mystical encounter between an individual and God. For the most part, Barth believes the encounter with God is mediated through the things and persons which God has created. Of course, the encounter between the individual and the Living Word can never be overlooked in Barth's christocentric theology. The latter enables the former to take place.

28 See, e.g., Hector C. Sabelli and Linnea Carlson-Sabelli, "Biological Priority and Psychological Supremacy: A New Inte-

grative Paradigm Derived From Process Theory," *American Journal of Psychiatry*, Vol. 146:12, (December 1989). In order to push beyond the old stalemate of: "either biology or psychology," the authors look back to the philosophy of Heraclitus for more dynamic and integrative paradigms. I see no reason not to include the "spiritual" at the highest level of the hierarchy.

[29] *Transformation and Convergence in the Frame of Knowledge*, (Eerdmans: Grand Rapids, 1984) p. 229 ff.
[30] *Transformation and Convergence*, p. 230.
[31] In addition to Torrance, see also W. J. Neidhardt, "Thomas F. Torrance's Integration of Judeo-Christian Theology and Natural Science: Some Key Themes." *Perspectives on Science and Christian Faith*, (June 1989) pp. 87-98; esp. 93 ff.

Books Received and Available for Review

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

L. Aden & J. Ellens, (eds,), *Christian Perspectives on Human Development*, Baker
B. Appleyard, *Understanding the Present*, Doubleday
L. Bailey, *Genesis, Creation, and Creationism*, Paulist
A. Berry, *The Book of Scientific Anecdotes*, Prometheus Press
S. Bratton, *Christianity, Wilderness, and Wildlife*, Scranton University Press
R. Cole-Turner, *The New Genesis: Theology and Genetic Revolution*, Westminster, John Knox Press
D. DeYoung, *Weather and the Bible: 100 Questions and Answers*, Baker
C. Gay, *With Liberty and Justice for Whom? The Recent Evangelical Debate over Capitalism*, Eerdmans
W. Harwood, *Mythology's Last Gods: Yahweh and Jesus*, Prometheus Press
T. Hill & D. Shirley, *A Good Death: Taking More Control at the End of Your Life*, Addison
T. Janabi, *Clinging to a Myth: The Story Behind Evolution*, ATP
R. Land & L. Moore, (eds.), *The Earth is the Lord's: Christians and the Environment*, Broadman Press
K. Lindskoog, *Fakes, Frauds, and Other Malarkey: 301 Amazing Stories and How Not to Be Fooled*, Zondervan
D. Locke, *Science as Writing*, Yale University Press
M. Lubenow, *Bones of Contention: A Creationist Assessment of Human Fossils*, Baker
D. McKown, *The Myth-Maker's Magic: Behind the Illusion of Creation Science*, Prometheus
L. Margulis & L. Olendzendki, (eds.), *Environmental Evolution: Effects of the Origin and Evolution of Life on Planet Earth*, MIT Press
J. Moss, *Novelties in the Heavens: Rhetoric and Science in the Copernican Controversy*, Chicago
R. Numbers, *Prophetess of Health: Ellen G. White and the Origins of Seventh-Day Adventist Health Reform*, Tennessee University Press
I. Pardes, *Contradictions in the Bible: A Feminist Approach*, Harvard
H. Santmire, *The Travail of Nature: The Ambiguous Ecological Promise of Christian Theology*, Fortress
S. Strahler, *Understanding Science*, Prometheus
J. Stott, *The Contemporary Christian: Applying God's Word to Today's World*, IVP
B. Swimme & T. Berry, *The Universe Story: A Celebration of the Unfolding of the Cosmos*, Harper
L. Swindler, *The Meaning of Life at the Edge of the Third Millennium*, Paulist Press
R. Wooffitt, *Telling Tales of the Unexpected: The Organization of Factual Discourse*, Barnes & Noble
C. Woteki, *Eat for Life: The Food and Nutrition Board's Guide to Reducing Your Risk of Chronic Disease*, National Academy Press

Communications

The Real Meaning of Evolution

JOHN L. WIESTER

7820 Santa Rosa Rd.
Buellton, CA 93427

"When I use a word," Humpty Dumpty said,
in rather a scornful tone, "it means just what
I choose it to mean — neither more nor less."
"The question is," said Alice, "whether you
can make words mean so many different things."
"The question is," said Humpty Dumpty,
"which is to be master — that's all."

The purpose of this communication is to review the various meanings of the term *evolution*, to demonstrate that evolution means the direct opposite of intelligent design to the secular scientific community; and to plead for ASA members' adherence to ASA's 1991 resolution on "teaching evolution *as science*." In closing, I will comment on the two strategies proposed to teach evolution *as science*; one by Owen Gingerich and the other by Phillip Johnson.

The Meanings of Evolution

The ASA Resolution, "A Voice For Evolution *As Science*," was adopted by the ASA Executive Council on December 7, 1991. (For the full text of the resolution and its background, see *PSCF*, December 1992, p. 252.) In recognition of the fact that *evolution* has "evolved" into a word of multiple distinct and easily confused meanings, the pre-eminent recommendation of the ASA Executive Council was that "the terms *evolution* and *theory of evolution* should be carefully defined and used in a consistently scientific manner."

The background to the ASA Resolution lists five diverse examples of meanings of the word *evolution* that must be distinguished from one another. These are:

(1) the general concept of "change over time"

(2) the hypothesis that all "organisms are related through common ancestry"

(3) a theory setting forth "a particular explanatory mechanism for the pattern and process described in (1) and (2)"

(4) limited, non-controversial meanings such as the concept of populations adapting to changing environments

(5) A religiously value-laden tenet of naturalist faith, that "Man is the result of a purposeless and natural process that did not have him in mind."[1]

Meanings (1), (2), and (3) are those identified and described by biologist Keith Stewart Thomson in his article, "The Meanings of Evolution."[2] To Thomson, "change over time is a fact," and descent from common ancestors is based on such unassailable logic that we act as though it is a fact. Thomson also states that "the third meaning for the word evolution is the *totally different sense* of a particular explanatory mechanism for the pattern and process described in the first and second meanings." (Emphasis added.) Furthermore, "the third meaning is currently confined to a particular explanatory hypothesis, Darwinism. The Darwinian mechanism [that] accounts for evolutionary change is natural selection, and has not seriously changed from his day to ours."

Meaning (4), "the concept of populations adapting to changing environments," is an example of a distinct and specific meaning that is well established and non-controversial. "Change in gene frequency" is another example in this category of non-controversial but limited meanings. The problem is that this and the first three meanings of evolution are often confused not only with each other, but with meaning (5), "Man is the result of a purposeless and natural process that did not have him in mind.

He was not planned." This quotation is from Darwinist spokesman George Gaylord Simpson's *The Meaning of Evolution*, a book that was rated by the New York *Times* as "...without question, the best general work on the meaning of evolution to appear in our time."

The Real Meaning of Evolution

It is my contention that for most people the term "evolution" has come to mean exactly what Simpson says it means. The writings of leading contemporary evolutionists, science educators, and science popularizers reinforce that contention. Regrettably, their views are representative of many of those who control science education, publications, and organizations, i.e. the scientific establishment. Contemporary Darwinist spokesmen are generally very clear about the real meaning or message of evolution. A statement by Douglas Futuyma is typical of many others:

> [If] the world and its creatures developed purely by material, physical forces, it could not have been designed and has no purpose or goal. The fundamentalist, in contrast, believes that everything in the world, every species and every characteristic of every species, was designed by an intelligent, purposeful artificer, and that it was made for a purpose. Nowhere does this contrast apply with more force than to the human species. Some shrink from the conclusion that the human species was not designed, has no purpose, and is the product of mere mechanical mechanisms — but this seems to be the message of evolution.[3]

The above statement about evolution is from a book written for the general public. Futuyma makes substantially the same point in the opening chapter of his textbook for college biology students, where he cites Darwin, Marx, and Freud as those who have provided "a crucial plank in the platform of mechanism and materialism."[4] Note also Futuyma's definition of a fundamentalist as one who believes that an intelligent, purposeful designer might have been active in the world. He contrasts that theistic world view with the message of evolution that human beings are "the product of mere mechanical mechanisms."

This view of what evolution really means not only is pervasive among evolutionary biologists, but is the conventional wisdom of most of those who control science education. Consider the revealing lament of science educator E. Peter Volpe at the first Science As a Way of Knowing (SAAWOK) symposium, which is the background symposium for Project 2061, a keystone project of AAAS, designed to make all Americans scientifically literate by the year 2061.

> But even after a year of introductory college biology (or perhaps because of such exposure!), the average student is still disbelieving that the human species is simply an incidental and fortuitous episode in the age-long history of life....Darwinian evolution does indeed offer a new way of looking at nature and a new way of looking at life. Yet, our college students have not appreciated the potentially profound implications of Darwinism for developing a comprehensive view of human nature.[5]

Volpe further complains that some of those college students believe that "humans are the unique crown of the universe ... with an ultimate destiny [afterlife] ... and an immortal soul." He insists that science educators replace this naive religious mindset with the "scientific" view that humans are "simply an animal ... an incidental and fortuitous episode in the age-long history of life."[6]

Through AAAS Project 2061 and state Science Frameworks, science educators are well on their way to correcting what some consider a defective understanding of what evolution really means. This agenda has been especially successful in California, where U.C. Berkeley paleontologist Kevin Padian, a principal author of the evolution section of the 1990 California Science Framework, complained that the "religious right" applied pressure to downplay or eliminate the treatment of evolution, but "the scientific and educational communities" were united in support of evolution. He then boasted, "As for the religious right, the new Science Framework leaves them totally disenfranchised from the public education system in California."[7]

It should be recognized that this fifth meaning of evolution, *humans are nothing more than a fortuitous accident of history*, is what the most highly respected and culturally important science popularizers are saying is the meaning of evolution. Carl Sagan attributes our human nature to "the result of apparently minor accidents in our immensely long evolutionary history" (*Cosmos*, p. 282) and also assures us that

> if artificial [intelligent] selection can make such major changes in so short a period of time [i.e., increased productions of wool and milk through domestication], what must natural [non-intelligent] selection, working over billions of years, be capable of? The answer is all the beauty and diversity of the biological world. Evolution is a fact, not a theory (*Cosmos*, p. 27).

The *Cosmos* television series has now been viewed by over 500 million people.

Carl Sagan's counterpart in Britain, Richard Dawkins, proclaims that human beings are not designed for a purpose but rather are the products of "natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life. [Natural selection] has no purpose in mind."[8]

The marketing flyer for the BBC video production of *The Blind Watchmaker* states that "the beautiful complexity of living things" was not produced by "an intelligent designer like God" but rather by "Evolution, the Blind Watchmaker." Notice that here "Evolution" and "the Blind Watchmaker" are used interchangeably. Stephen Jay Gould, in a recent article in *Scientific American*, argues that science and religion deal with two different realms, and that science is neutral with regard to religion.[9] Gould views writers like Sagan and Dawkins as extremists who do not represent mainstream science. It is, therefore, rather curious that in his latest (1989) book, *Wonderful Life*, Gould closes with the statement that the lesson of the Burgess Shale is that "We are the offspring of history, and must establish our own paths in this most diverse and interesting of conceivable universes — one indifferent to our suffering, and therefore offering us maximal freedom to thrive, or to fail, in our own chosen way."[10] Gould's self-proclaimed religious neutrality is also in conflict with his position that "In an entirely literal sense, we owe our existence, as large and reasoning mammals, to our lucky stars."[11] Apparently Gould's use of the term *religion* (as in, "neutral with regards to ...") excludes the theistic religions of Christianity, Judaism, and Islam.

The Darwinian use of the term *evolution* rejects design, purpose, and "creation" (in the broad and meaningful sense of the term). Evolution as defined by the Darwinists means naturalistic evolution, limited exclusively to purposeless, unguided processes. Intelligent design, or creation in any meaningful sense, is the direct opposite of Darwinian evolution, and it is Darwinian evolution with all its ideological meanings that is being taught in the public school system.

What should ASA do about what most of us would label as *evolutionism* masquerading as science?

Two Strategies

In his article "Further Reflections on *Darwin on Trial*, (*PSCF*, December 1992), Owen Gingerich starts from his discussion with Phillip Johnson at the 1992 ASA Annual Meeting with a point on which there was unanimous agreement. "The issue is not evolution versus creation. The issue is design versus accident." Further, Gingerich acknowledges that "Phillip Johnson has impressively documented the extent to which much evolutionary teaching comes with philosophical baggage claiming that 'accident' is a real feature of the world, 'proven' by evolutionary doctrine," adding that we "reject [this] evolution as a philosophy."[12] At that point, Gingerich offers his solution to the problem: "to launch the attack against the atheists who are using evolution to further their materialistic philosophies, against those who raise a reasonable structure of scientific explanation into a naturalistic ideology." This is the classic ASA solution, and one that we, the authors of *Teaching Science in a Climate of Controversy*, have pursued in our attempt to have evolution taught as science rather than ideology.

For example, in *Teaching Science* we take the position that science and religion are two separate disciplines answering two separate sets of questions. We stated that *science* answers the questions of *how* and *when*, and *religion* answers the questions of *who* and *why*. That position may be unrealistic, because Darwinists *are* answering the questions of *who* and *why;* their answers are the "Blind Watchmaker," and "for no purpose at all."[13] In effect, the Blind Watchmaker functions as *the* creator in the "scientific" creation story of our culture. We may be naive in thinking that there is still a place in academia for the Creator of theistic religion.

In my opinion, the Gingerich/ASA strategy has failed — and it has failed because it is based on the false premise that the scientific establishment disagrees with the position of Futuyma, Volpe, Dawkins, and Gould. On the contrary, the evidence points to the conclusion that official science agrees with those spokesmen that unguided, purposeless evolution (the Blind Watchmaker) has outmoded *any* concept of design, meaning or purpose in the history of life. My primary evidence for this contention is that such writers are not criticized for their views: they are honored. For example, in 1990 Richard Dawkins was presented with the "Michael Faraday Award" by the Royal Society (the British equivalent of the National Academy of Sciences, NAS). This annual award is presented to "the scientist who has done the most to further the public understanding of science." Dawkins was further honored by being selected by the Royal Society to give the 1991 Christmas Lectures, which were broadcast by the BBC on Channel Two. Here in America,

the biologists of the AAAS have now published the following official statement:

> Earth abounds in a diversity of living creatures, which all interact to some degree. Each type shares properties common to all life, and yet each is different, as a consequence of millions of years of chance evolutionary events. Identifying the differences and tracing their origins provides the mental framework for comprehending the place we humans have in the biosphere, as well as our present impact on it.[14]

Note that this endorsement of "chance evolutionary events" (American rhetoric for the Blind Watchmaker) is our creator to whom we look for our "mental framework." The Blind Watchmaker thesis is endorsed, not criticized, by the scientific establishment.

The Gingerich/ASA strategy has also failed to take into account that, for the time being, the Darwinists not only control the professional and popular literature, but science education as well. They control the terms of the debate. They set the agenda and the rules. *The Darwinists determine the meaning of the word "evolution."* In effect, we are like Alice in Wonderland trying to convince Humpty Dumpty to use words correctly, to use words with precision and keep science within the limits of truth. The problem is that Humpty Dumpty *is* the master, and this is the main reason that our efforts to date have had negligible effects. We may in fact have been leading the Christian community into a false sense of security while the Darwinists use the institutional power of official science to tell our culture what evolution really means.

Johnson's Strategy

Owen Gingerich states that Johnson's strategy "appears to invoke a frontal attack on evolution." His further description of Johnson's strategy is misleading because Gingerich neither defines the term *evolution* nor uses the term with consistency of meaning. I will therefore outline what the Johnson strategy is.

Johnson's strategy is not a frontal attack on the vague and meaningless term *evolution*. Rather, his strategy is the same as that endorsed by the ASA in its resolution, "A Voice For Evolution *As Science*." First, we should avoid the protean word "evolution." If we must use the term, we should do so only with precise definition and consistency of use.

Second, we should insist that unanswered questions be included in teaching "evolution." The specific question Johnson wishes to press is, "What is the empirical evidence for the power of unguided natural selection acting on purposeless, random genetic variability to create new organs and new organisms?" In other words, what is the evidence that the Blind Watchmaker can create biological complexity (in contrast to diversity)? To date, atheists and some theists have avoided answering this question by rhetorical maneuver, the most typical being shifting the meaning of evolution to "change," "genetic relatedness," or "populations adapting to changing environments."

Another standard maneuver to avoid the question is to shift the topic from scientific evidence to religion. For example, speculations as to how God would or would not have created serve to divert attention from the crucial issue of scientific evidence for the Blind Watchmaker thesis.

It is understandable why atheists should try to avoid placing on the table the issue of the warrant for the Blind Watchmaker thesis. Regrettably, through a failure to see or acknowledge what evolution has come to mean in the real world today, some theists have been lead into inadvertent support of the atheists' tactics. Perhaps the time has come for theists, guided by our love for truth, to cut through the rhetorical fog. We need to focus our attention on the scientific *evidence*, whether it supports *or* challenges the Blind Watchmaker thesis.

We have nothing to lose but our preconceptions. ❑

NOTES

[1] Simpson, George Gaylord, *The Meaning of Evolution*, 1967, p. 345.

[2] Thomson, Keith Stewart, *American Scientist*, Vol. 70, pp. 529-31, Sept.-Oct. 1982.

[3] Futuyma, Douglas, *Science on Trial: The Case for Evolution*, 1983, pp. 12-13.

[4] Futuyma, Douglas, *Evolutionary Biology*, p. 3 (2nd ed. 1986).

[5] Volpe, E.P., "The Shame of Science Education," *American Zoologist*, 1984, pp. 24, 435. From the symposium on *Science as a Way of Knowing — Evolutionary Biology*, presented at the Annual Meeting of the American Society of Zoologists, December 1983, Philadelphia, Pennsylvania.

[6] *Ibid.*

[7] "The California Science Framework: A Victory for Scientific Integrity," *National Center for Science Education Reports*, 9(6). For an analysis of the 1990 *California Science Framework*, see Hartwig, M. and Nelson, P.A. (1992), *Invitation to Conflict: A Retrospective Look At the California Science Framework* (Access Research Network, P.O. Box 38069, Colorado Springs, CO 80937. See also Wiester, J., "Teaching Evolution as Non-Science: Examples From California's 1990 *Science Framework*," *PSCF*, 43:3, 190, S 1991.

[8] Dawkins, Richard, *The Blind Watchmaker* (1986), p. 1, 5.

[9] Gould, Stephen Jay, "Impeaching a Self-Appointed Judge," *Scientific American*, July 1992.

[10] Gould, Stephen Jay, *Wonderful Life: The Burgess Shale and the Nature of History*, 1989, p. 323.

[11] Ibid., p. 318.

[12] *PSCF*, 44:4, p. 253, D 1992.

[13] A recent example of scientistic imperialism is to be found in Richard Leakey's 1992 book *Origins Reconsidered*, where Leakey phrases his "quest as finding out what plans, if any, God had for *Homo Sapiens*" (p. 342). His answer is that "God surely had no plans for *Homo Sapiens* and couldn't even have predicted that such a species would ever arise" (p. 349).

[14] AAAS, *Biological and Health Sciences: A Project 2061 Panel Report*, Washington, D.C.: American Association for the Advancement of Science, p. 16. This report is one of six reports written as part of the first phase of Project 2061, a long-term, multiphase undertaking of the American Association for the Advancement of Science designed to help reform science, mathematics, and technology education in the United States. For an analysis of Project 2061, see "Project 2061: Visions of Science, Visions of Ourselves," *Origins Research*, Vol. 14:1, available from Access Research Network, P.O. Box 38069, Colorado Springs, CO 80937-8069.

The Infinite and the Finite

ADAM DROZDEK

Department of Mathematics and Computer Science
Duquesne University
Pittsburgh, PA 15282

A very interesting paper by Bruce A. Hedman on the concept of infinity appeared recently in *Perspectives* (45:1). However, the importance of this concept, for Cantor in particular and for philosophy in general, does not seem to have been sufficiently stressed by the author.

First, Hedman treats Kant a bit too harshly by blaming him for pushing the incontingent world view to the extreme by screening the mind from *noumena* and making it occupy itself only with *phenomena* using its "innate patterns," an *a priori* knowledge. This, however, suggests a limiting view of the Kantian philosophy, according to which Kant was primarily interested in cognition. Analysis of cognition constituted to him a stepping stone for analysis of the problem of morality, which was the core of Kant's philosophy.

Kant wanted to defend man's dignity by showing that he is *not* one of the cogs of the universe ruled deterministically by mechanical laws. In order to defeat this world view, Kant had to first explore the nature and *limitations* of scientific cognition, thereby showing that science is unable to encompass everything within the confines of its categories. Science only has a limited scope, and scientists are just "artificers in the field of reason" (*Critique of Pure Reason*, A839/B867), and for "the necessary practical employment of reason" it is needed "to take away from this reason its pretensions to transcendent insight" (Kant, Bxxx). The highest goal of human reason should be the study of the "whole vocation of man," the study of morality (Kant, A840/B868). Thus, the study of theoretical reason precedes the study of practical reason. Theoretical and practical reasons, however, may have conflicting interests which are resolved under the guidance of practical reason; that is, practical reason (ethics) has priority over pure reason (cognition). Kant even "argued that of itself theoretical activity is neither unconditionally nor intrinsically good; it is valuable only insofar as it enhances moral practice and offers morally permissible maxims of happiness!"[1] Therefore, practical reason is the highest arbiter in the case of any conflict, and its decisions can nullify even decisions of theoretical reason. Hence, Kant very clearly embraces contingent rationality by seeing that science has no final answers; these answers can be found in other domains than of practical reason.

On the other hand, Kant clearly spoke about *a priori* knowledge. But this knowledge is acquired using an *a priori* cognitive apparatus, and this is, in fact, what makes it *a priori*. The design of such an apparatus was based by Kant on Newtonian physics, but it seems that Kant would not insist that it is the only solution which can be given, especially if practical reason would have its say. Newtonian physics turned out to have a non-universal validity, but it does not devoid Kant's approach of all reasonableness. There are inherited elements in the human mind which allow man to live, although we may be mistaken with regard to their nature. Chomsky would mention here linguistic competency, which allows man to acquire any language. Similarly, the apparatus to process sense perceptions can be flexible enough to accommodate to any physics or geometry, but such an apparatus is an *a priori*. This view is also corroborated by Cantor, although, in the process of proving Cantor's contingent rationality, Hedman does not emphasize this point sufficiently. The point in question is the relationship between actual and potential infinity, and between the infinite and the finite.

Can the infinite be derived from the finite? The question may seem to have an obvious answer, since by an endless repetition of simple operations endless entities can be derived. But in this statement an *idem per idem* explanation is being used, since generating an *endless* entity uses the ability to make *endless* repetitions as a presumption. Infinity is assumed before it is even proved.

This implicit assumption is also made to establish the validity of some claims. One of its earliest uses was made by Zeno of Elea (5th century B.C.) who

says in one of his paradoxes that a person moving from one point to another has first to reach half the distance; before he can do this, a half of the half must be reached, and before he can do that, he must traverse a half of that half's half, and so on to infinity. Since there is an infinite number of such divisions, the person, according to Zeno, is not able to cover the distance in a finite time and simply does not move. It may be easily proved that this series is convergent, i.e., Zeno's argument is formally (and also practically) wrong, but for us it is important that the alleged impossibility of covering an infinite number of intervals was proved in finite time by virtue of what can be called the *and so on* principle. It was unquestionable that one could, theoretically speaking, construct successive divisions, although nobody would be able to actually accomplish it. Thus the concept of potential infinity was freely used in the ancient thought and was taken for granted, although actual infinity was denied implicitly by Plato and explicitly by Aristotle up until the time of Cantor.

However, the *and so on* principle was used from then on not only in philosophy and common sense reasoning, but also in mathematics. But as Gottlob Frege pointed out, this was a formally incorrect method, and could not constitute the ultimate basis of proving mathematical theorems. According to Frege, nobody could, "to take a crude example," decide by means of that principle, "whether the number Julius Caesar belongs to a concept, or whether that famous conqueror of Gaul is a number or not."[2] Therefore, a formally correct formulation of the principle of complete induction is needed. The principle was implicitly applied by Levi ben Gerson in *Maase Choteb* (1321) and by Blaise Pascal in *Traité du Triangle Arithmetique* (1654) and it was explicitly formulated for the first time by Giuseppe Peano in *Aritmetices Principia Nova Methodo Exposita* (1889) as the fifth axiom of his theory of natural numbers.[3] The axiom states that if a subset A of natural numbers contains zero and every number only if its predecessor belongs to A, then A contains each natural number, ie.,

$$\underset{A \subset N}{\forall} (0 \in A \wedge \underset{n}{\forall}(n \in A \Rightarrow succ(n) \in A) \Rightarrow N \subset A).$$

This means that the set N of integers is the smallest set among all such sets which contain 0, and along with any element n, they also contain its successor, whereby N will not include "the famous conqueror of Gaul," although some sets A may include him. Thus, N is composed of integers only and nothing else. This axiom can be presented in an equivalent form (under *modus ponens*) as a rule used for proving theorems by induction, as in

$$\frac{0 \in A \qquad \underset{n}{\forall}(n \in A \Rightarrow succ\ (n) \in A)}{N \subset A}$$

which means that if the sentence $0 \in A$ has been proven and, on the inductive hypothesis $n \in A$ (for arbitrary $n \in N$), sentence $(n+1) \in A$ has been proven, then it can be concluded that any integer is in A. The idea is that the proof of '$(n+1) \in A$' from '$n \in A$' can be repeated *ad infinitum* to produce the universal sentence $\underset{m \in N}{\forall} m \in A$. Thus, induction compresses an infinite number of steps, or it tacitly assumes that an infinite repetition is feasible. But even assuming that such a repetition is possible, induction does not prove that an infinite set exists. It only states that if zero is in an A, and if for each n it includes both n and its successor, then N is a subset of A, that is, A is infinite. But the principle of infinite induction by itself is powerless to create an infinite set. It coveys certain ideas of how to do it, but it may only lead from proven statements to conclusions. This, so to speak, sets the tone for, to use Thoralf Post's expression, "the recursive mode of reasoning"[4] to constructively approach infinity, but it is not the solution for the construction proper. What is needed is an axiom of infinity, later assumed explicitly in set theory. It can be claimed that the use of recursive definitions would be sufficient and existence of no infinite set would have to be made. Peano, in fact, used such definitions in his system, in particular to define addition and multiplication, thereby substantially extending his system.

Recursive definitions are needed to show how to generate elements of a set (or how to generate new values for a function) being defined, and also to show that such a function exists *in toto*. This is what Richard Dedekind did in his *Was Sind und Was Sollen die Zahlen* (1888). However, in his system, recursive definitions are provable, but at the cost of "proving" that an infinite set exists that is a set for which a 1-1 mapping into its proper subset can be determined. Dedekind referred in this attempt to his own *Gedankenwelt*, a realm of thought. His proof (of theorem 66), however, did not guarantee uniqueness of elements in the sequence S = {thought t, thought on thought t, thought on thought on thought t, ... }. On the other hand, if man is able to think only a finite number of thoughts, can reference to thought be convincing? "So the validity of Dedekind's proof rests on the assumption that thoughts obtain independently of our thinking,"[5]

which is another blow against Dedekind's proof, which he considered "clear." But what is important is that while generating sequence *S*, Dedekind implicitly used recursive definition. Thus, before proving it, he used it, if only outside his "science of arithmetics."

Would the use of recursive definitions at the beginning of the system solve the problem of infinity? As indicated, Dedekind did not succeed. But can we succeed? First, recursive definitions can generate an infinite set if applied and reapplied endlessly by an indefinite repetition which derives new elements from those already existing. This possibility of repeating some operations an infinite number of times should not be limited, even in theory, otherwise it would be only verbal infinity, a pretense of an infinite creation. The concept of infinity is, therefore, assumed before any generating process starts. Secondly, recursive definitions cannot create anything *ex nihilo:* they have to presume an existence of infinite resources, even if these resources are only in our creative mind. This latter problem was recognized by Cantor, who wrote in his *Briefbuch* (1886):

> In order for a changing quantity [the potential infinity] to be usable in any mathematical analysis, there must, strictly speaking, be known by definition the "area" of its changeability; this "area" cannot be anything changeable, otherwise a solid basis for the analysis would be missing; this "area" of values is then a certain actually infinite set. And hence, any potential infinity presupposes an actual infinity to be strictly usable in mathematics.[6]

The concept of infinity already exists and all efforts are made to hide it behind potential infinity in the form of allowing a possibility to infinitely apply some procedure. Thus Cantor was justified in saying: "the potential infinity has only a borrowed reality, insofar as it constantly points towards the actual infinity, through which it is possible in the first place."[7] Actual infinity precedes potential infinity, the latter being a result of our limited comprehension and limited generation powers rather than a result of the ontological nature of the world.

Set theory solves the problem of infinity rather simply by introducing an axiom of infinity which Ernest Zermelo formulated as:

$$\exists_X (\emptyset \in X \wedge (z \in X \Rightarrow \{ z \} \in X)),$$

which allowed the generation of an infinite sequence $\{\emptyset, \{\emptyset\}, \{\{\emptyset\}\}, \ldots\}$ (although, by this axiom, X can have more elements than just these). The axiom uses a generation rule established by recursive definitions, hence no pretense was made that an infinite set can be generated outside theory, as Dedekind attempted to do. Zermelo introduces such an infinite set by a simple *fiat*, indicating how new elements can be derived from those already in *X*; but the existence of such an infinite set is ascertained from the outset. He needs an actual infinity in his set theory, doing it in "the recursive mode of reasoning." It is an assumption of actual infinity with a bow towards potential infinity.

This solution is made in the Cantorian spirit. Cantor very clearly realized that talk about potential infinity is either paradoxical or untruthful. It is paradoxical, since potential infinity is not infinite at any time. It is a non-existent entity assumed for the sake of argument and only approximated by something finite. On the other hand, discussion of potential infinity may be considered untruthful, since if extending the finite indefinitely is actually possible, then this infinity exists, if only in the future, if only in the mind of the beholder.

It is interesting to notice that we may go even further, in particular when we refer to Turing machines. The concept of Turing machines is entangled in the problem of infinity. Turing machines allow us to perform very complex operations using extremely simple steps defined on a finite number of states. They can use only 0's and 1's and yet perform very impressive operations. However, there is an underlying assumption that an infinite tape is available and also infinite time. The tape is not potentially existing, but actually. Operations of Turing machines are interesting and useful, if eventually ended. But regardless of the number of transitions, the tape should be infinite (linear-bounded automata have a limited power of dealing only with context-sensitive languages). Hence, infinity has to be known and at hand in order to grapple with the finite. There has to be set an infinite stage to allow finite actors to perform. The finite presupposes infinity, infinity is prior to the finite — a paradoxical if not surprising result. In cases like this, we may agree with Descartes, who said in the third meditation that "in some way I have in me the notion of the infinite earlier that the finite."[8]

This result might have been expected after we realized that potential infinity is a dignified name for the finite which is in the process of extension. Therefore, because potential infinity is simply extending indefinitely the finite, we may strengthen Cantor's statement on the priority of actual infinity over potential infinity by stating that the infinite precedes the finite.

And the infinite? The infinite is simply given to us: it is a synthetic *a priori* datum. God implanted it in our minds. "He has put eternity into man's mind" (Eccl. 3:11), the infinite "even inhabits our minds."[9] This infinite is an endowment which we bring to this world, it is an endowment with which the world can be understood. It is an *a priori* which enables the cognitive *a posteriori*, an incontingent tool which allows us to grasp the contingent rationality. It is truly a great achievement of Cantor that he ceased to hide the assumption of infinity behind ever-extending the finite and made a scientific concept out of what was allowed to have existed only in theology. ❑

NOTES

[1] Roger J. Sullivan, *Immanuel Kant's Moral Theory*, Cambridge: Cambridge University Press 1989, p. 97.
[2] Gottlob Frege, *The Foundations of Arithmetic*, London: Basil Blackwell 1950, p. 68.
[3] Joseph Carlebach, *Lewi ben Gerson als Mathematiker*, Heidelberg 1908, p. 56; Blaise Pascal, *Oeuvres Complètes*, Paris 1963, pp. 56-57; Giuseppe Peano, *Selected Works*, London 1973, p. 113.
[4] Quoted from G.T. Kneebone, *Mathematical Logic and the Foundations of Mathematics*, London: Van Norstrand 1963, p. 266.
[5] Gottlob Frege, *Posthumous Writings*, Chicago: Chicago University Press 1979, p. 136.
[6] Herbert Meschkowski, *Probleme des Undendlichen: Werk und Leben Georg Cantors*, Braunschweig: Vieweg 1967, p. 250.
[7] Georg Cantor, *Gesammelte Abhandlungen*, Berlin 1932, p. 404.
[8] René Descartes, *The Philosophical Works*, Cambridge: Cambridge University Press 1967, v.1, p. 166.
[9] Georg Cantor, *op. cit.*, 375.

Essay Book Review

Darwin: A Man of His Times — A Theory of Its Time?

SARA MILES

History Department
Wheaton College
Wheaton, IL 60187

Darwin: The Life of a Tormented Evolutionist by Adrian Desmond and James Moore. New York: Warner Books, 1991.

The positivistic approach to science has had, as an underlying assumption, the total objectivity of the scientist. The truth about nature is thought to be "out there," waiting to be found, and any person — no matter of what national, ethnic, gender, or class background — is capable of finding it. Thus, scientific research articles are written in the passive voice: "It was determined that ... "; "it was discovered that ... " Moreover, the time of discovery is thought to be limited by and dependent on the state of knowledge and technological inventions. Hence, for example, in the 19th century, "truths" discovered about physiology required preliminary advances in organic chemistry, and cells could not be discovered and described until microscopes had improved enough for scientists to be able to see "accurately" the structure of living organisms. Based on this positivistic philosophy, scientific biographies had a somewhat hagiographic purpose: the honoring of the scientist who "got there first."

Since Thomas Kuhn's *Structure of Scientific Revolutions*[1] was published in 1962, however, the positivistic approach has been under attack. It is now generally acknowledged that no scientist can be totally objective, and that so-called "external" factors influence the way scientists view nature, the questions they ask about nature, the methods used to answer those questions, and the forms the answers take. While the exact meaning of "influence" is still at issue, biographies of scientists now have a different purpose. Instead of honoring the "winner" in the scientific race, biographies must now tell a much more complex story — one that describes the personal and private life of the scientist as well as its social and public context, and that then tries to relate both life and context to scientific practice.

Adrian Desmond and James Moore state in the prefatory chapter of their new biography *Darwin: The Life of a Tormented Evolutionist*[2] that it is this latter kind of biography that they purposed to write:

> Our *Darwin* sets out to be different — to pose the awkward questions, to probe interests and motivations, to portray the scientific expert as a product of his time; to depict a man grappling with immensities in a society undergoing reform.[3]

The result of their efforts has been variously described as "a splendid book,"[4] "an extraordinary monument,"[5] and "a riveting *tour de force*."[6] The extensive use of superlative phrases to characterize this book indicates the wide-spread recognition that the authors have indeed produced a new standard both for biographies about Darwin and for scientific biographies in general. The book reflects the "thick description" prescribed by Clifford Geertz[7] and the "archeological digging" enjoined by Michel Foucault.[8] Yet the authors maintain a narrative remi-

niscent of a good novel, and can carry the reader effortlessly along through the myriad details filling the 677 pages of text, in addition to 91 well selected photographs, which result from the authors' painstaking and exhaustive research, noted in 100 pages of references.

So what does the reader learn? First, the Charles Darwin portrayed by Desmond and Moore is in reality many Darwins: there are the scientific Darwin, the invalid Darwin, the son/brother/husband/father/family-man Darwin, the social and political manipulator Darwin, the "Devil's Chaplain" Darwin, the economic speculator Darwin, the "let's-keep-up-appearances-at-all-costs" Darwin, the insecure Darwin, the student Darwin, and innumerable other Darwins who surface in particular situations. The result is a composite picture of Darwin that is much more living and dynamic, much more nuanced and complex than previous biographies have produced. One begins to believe that one *knows* Darwin as a person: what he likes and dislikes, how he reacts in a given situation, why he thinks the way he does. In reading the book one begins to anticipate how he will behave. For example, having learned how Darwin's work and thought patterns affect his health, the reader begins to sense when tension and overwork are going to cause him to be sick again, and, sure enough, Darwin is soon back in bed. One starts to feel Darwin's discomfort and nausea on the *Beagle*, his excitement at exploring Copiapó and the Guasco Valley, his mental and spiritual unsettledness at seeing the people of Tierra del Fuego and trying to understand what it means to be "human."

Second, new interpretations and values are put on well-known events of Darwin's life, and less-well known incidents are given coverage and import. Three examples will illustrate this contribution of the book. First, in most biographies of Darwin, his time in Edinburgh studying medicine is depicted as a time in which young Darwin begins to emancipate himself from his family, rejects a medical career, and becomes interested in a quasi-professional approach to natural history. In this biography, however, the time in Edinburgh is portrayed as critical both intellectually and psychologically for Darwin, for he is introduced through the Plinian Society to radical views, including ideas about the materialistic basis of mind, and observes what happens to those who do not follow the "party line." The Plinian Society thus challenges and warns Darwin: it challenges him with non-orthodox views; it warns him that heterodoxy is dangerous. Desmond and Moore use these experiences in Edinburgh as the basis for explaining Darwin's later hesitancy to publish his new theory, and they interpret actions and comments of the older Darwin in light of these lessons supposedly learned as a young man. Edinburgh thus becomes much more important in explaining Darwin's later ideas and behavior than it has been in earlier biographies.

A second example of reinterpretation of events concerns Darwin's voyage on the *Beagle*. Most people who know anything about Darwin's trip know about the Galapogos Islands and his experiences with turtles and finches, and his exploration of this region is considered to be seminal for the development of his evolutionary views. Thus, Peter Brent's biography, *Charles Darwin: A Man of Enlarged Curiosity*,[9] devotes the whole of chapter 7 to Darwin's findings on this archipelago. On the other hand, little is known or reported about Darwin's experience with the Fuegians of Tierra del Fuego. Brent's work describes the encounters with these people, but the thrust of his presentation is that these exchanges with "natives" were interesting "sightseeing" episodes, but of no real importance to his work in natural history. Desmond and Moore, however, depict these encounters as being critical to the development of Darwin's theories, for they caused him to see how narrow the gap was between pongids and humans — if there was a gap at all. They also argue that the visit to the Galapogos Islands was not important for Darwin at the time, but only in retrospect. Darwin is portrayed as not really appreciating what he saw, not really understanding what he was told about the animals on the islands, and not really taking much care in his collecting. Hence Desmond and Moore ask the reader to reevaluate these episodes and their importance to Darwin's theorizing.

A final example illustrating the revised interpretation of Darwinian ideas or activities concerns the stress Darwin placed on animal breeding and sexual selection. Far from being a pragmatic way of dealing with theoretical questions, this emphasis, according to Desmond and Moore, arose largely from his own worries regarding the intermarriages in his own family and the inferior health that he saw in his children. Charles Darwin married his cousin, Emma Wedgewood, and there had been earlier cases of "interbreeding" between the Darwin and Wedgewood families. As Darwin worked on his theory, he also struggled with the apparent lack of "selective fit" in his own children. Eugenics (a "science" first developed by his cousin Francis Galton) not only illustrated for him the truths of his theory, but explained the personal tragedies and adversities faced by the Darwin-Wedgewood clans, and it was this personal aspect that was predominate, according to these authors. Challenging the reader to compre-

hend that the scientist Darwin did not leave personal issues aside when doing his work, Desmond and Moore produce a very human scientist whose personal concerns and theoretical concerns were never that far apart.

Admirable, fascinating, and enlightening as this book is, the authors' reconstruction of the life of Darwin raises some interesting and profound questions, however. First, there is the question about the accuracy of the picture of Darwin we see. Do we know Charles Darwin as he actually lived and thought and felt, or do we know the Darwin that Desmond and Moore want us to know and therefore have constructed for us? If earlier biographies provided us with a 2-dimensional straw man Darwin, is it not possible that all Desmond and Moore have given us is a 3-dimensional straw man — but a straw man nevertheless? I raise the question of accuracy not to impute the authors' integrity, but to point out firstly the dilemma of selection facing Darwin scholars at present as they sift through the massive Darwinian corpus. For instance, it is a great advantage that Darwin's correspondence is currently being published; the problem is that there are already seven volumes and yet the correspondence only goes up to 1859,[10] i.e., just *prior* to the publication of *On the Origin of Species*. His notebooks, journals, and diaries are likewise detailed and lengthy. How does one decide *which* comments to privilege, *which* events to emphasize, *which* relationships to prioritize? Scholars/biographers must have some filter, some *a priori* set of beliefs that allow them to organize the data in a particular way. In this case, it means that we have *one* picture of Darwin, but it is an interpretative portrait, not a dispassionate or objective photograph. In spite of the superlatives used to describe this biography, it is not the *definitive* biography (and the authors would be the first to agree that it is not), for selection and presentation require the perspective of an artist, and different artists see — and help us to see — situations differently. Therefore a "definitive" biography will not be forthcoming.

It is vital, though, that the reader understand, first, that choices were made and, second, that they were made for some reason. If the scholar has a Herculean task to sort through the massive piles of documents, the consumer of the resulting scholarship has an impossible one to know if a proper selection has been made. Therefore the reader must take a certain amount on faith. But if s/he is to do that, it would be wise to know the reasons for the scholar's choices, and in this case the choice is determined by the authors' historiography. That historiographical perspective may be evident to trained historians of science, but it probably is not to the general, educated readers. As a result, the latter may find themselves accepting the implied conclusions derived from the authors' implicit interpretative stance, but had the perspective been made explicit, the readers would have been more critical and skeptical of the inferences.

Desmond and Moore operate within the historiographical tradition called sociology of knowledge. In its most basic form, this position simply claims that scientific "facts" and theories are not hermetically sealed from social, cultural, political, economic, philosophical, and/or religious events and theories. In its most extreme form, it asserts that external factors, not the reality of nature, determine the content and expression of science. In other words, scientific theories are dependent on, and the result of, the social, cultural, political, etc. context. Desmond's earlier works[11] have placed him very close to this latter form, whereas Moore's work[12] has been a little more centrist, but still more toward this latter position.

Locating Desmond and Moore in terms of their historiography helps to explain why at times their biography of Darwin seems to tell *two* stories: one about Darwin and one about England. The two story lines are juxtaposed, sometimes side by side, sometimes interwoven, but always near to each other. The activities of the atheists Richard Carlile and Robert Taylor (whose sobriquet "The Devil's Chaplain" made a lasting impression on Darwin) during Darwin's Cambridge years are laid alongside his study of Paley's Natural Theology; the battles of the Crimean War are described just as Darwin is portrayed as wrestling with the idea of plant seeds trying to establish "beachheads" on islands they are "invading;" debate over the Whig-sponsored Poor Laws coincides with Darwin's theorizing over competition and natural selection. The reader is meant to deduce that the social events in some way influenced Darwin's thinking — if not consciously, at least subconsciously; if not immediately, at least ultimately.

The issue is what the nature of that influence is exactly. Do events *determine* the *theory*? Do they *determine* the *expression of* the theory? Or is *determine* too strong a word to employ? Do they merely *suggest* ways in which nature may be seen to operate and explained? Desmond and Moore do not tell us here what they believe to be the nature of that influence, but their earlier works indicate that they would most likely advocate either the first or second position, and more probably the former. However, there are major philosophical and theological differences between these two answers.

In terms of the philosophy of science, the important issue of realism is raised by these views. Realism holds that nature and objects and phenomena of nature exist and act independently of our knowledge of them. Moreover, realists would argue that the reality of the natural world somehow limits what can and must be explained. Scientists seek to describe actual occurrences in nature, and so, for instance, they would not seek to develop theories about bodies falling upwards or butterflies swimming. This is not to say that they would insist that every theory *really* describes reality, but it is to argue that every theory is an *attempt* to really describe real nature.

The more extreme position in the sociology of knowledge — the one that would say that events determine the theory — leads to an anti-realist position, for scientists see only what social events program them to see. While nature *may* be real, theories describing it can not be said to be real explanations since they are determined by historical contingencies and not by natural phenomena. Moreover, the evaluation of theories ultimately boils down to judgments about social, political, economic, and/or religious philosophies, not to verdicts based on how closely a theory describes or predicts natural phenomena. If this is the position of Desmond and Moore, then are they not forced, along with Karl Marx, to conclude that evolution by natural selection is just a bourgeois, Whig, capitalistic, Victorian theory of nature? And how is that conclusion ultimately different from the position of creation scientists who claim that Darwin's theory is just an outgrowth of a secular, materialistic world view? In both cases, nature does not do the informing; society does.

Moreover, if this historiographical method is valid in the history of science, it is also valid in the history of theology. Just as society determines the form and content of science, so it determines the form and content of theology. God *may* exist, but truth claims about his nature and activity are as invalid as truth claims in science about natural objects and events. Theology becomes nothing more than a socially-shaped statement of what we believe about God; it is not limited or shaped by what God says about himself.

And if we can use this historiographical approach in history of science and history of theology, can we not also use it when examining a historical biography? What social factors determined what Desmond and Moore could see? What political events influenced which data they selected from the notebooks, journals, and diaries? What economic debates affected the way in which they contextualized the events of Darwin's work? What philosophic and religious commitments biased their reconstruction of Darwin's life? Would an economically conservative, socially moderate, evangelical Christian or a nationalistic, militant, fundamentalist Irani Shi'ite select the same data, see the same relationships, draw the same conclusions? If the answer to this last question is "No, they would not," then what is the purpose of scholarship, and what are the criteria for judging historical or scientific opinions? Ultimately, it seems to me, this extreme sociology of knowledge position leads to an intellectual and religious skepticism and angst, which makes the life of the mind and the life of faith futile.

However, if what Desmond and Moore are trying to do is to demonstrate how the *form* of scientific theories (or historical explanations) may be inspired by externalities, then their method is much more fruitful and illuminating for Christian scholars. Such an approach requires that we acknowledge the tension between our apprehension of reality and our attempts to define, describe, and explain it. That is true whether the reality be nature or God, natural or spiritual. This historiographical method claims that scientific positivism is dead, and Christians can be heartened by its demise. The framing of scientific explanations, while originating with our experience of nature, nevertheless is always partial, always biased, always influenced by a particular historical context, and constantly requiring reformulation.

But we also need to see that theological positivism must also be put aside. Our theological creeds, themselves originating with our experiences of God and his revelations of himself, are likewise incomplete, prejudiced, historically contingent, and ever in need of reexamination. In this respect, Desmond and Moore's book reminds us that if we are to understand either a scientific theory or a creedal statement, we must understand the historical context in which it was articulated. It calls us to examine carefully traditional ideas about the importance of particular events or the nature of specific influences in the development of a scientific concept or the exposition of a theological doctrine. Finally, it admonishes us to remember that the scientist and the theologian are not immune to the biases, presuppositions, and events of the societies in which they live. Neither scientific theory nor theological pronouncement should be accepted or rejected without carefully examining the social and historical context in which it was first articulated. Only then will we understand the meaning behind the form.

Thus *Darwin* serves us as a source book for better understanding the life of Charles Darwin, as a model

of how the history of science — and the history of theology — should be done, as a warning against naive social determinism, and as a reminder that our knowledge of both nature and God will always be limited and shaped by personal and historical forces. For these reasons, it is a remarkable book and one that merits close and continued study. ❑

NOTES

[1] Thomas S. Kuhn. *The Structure of Scientific Revolutions*. Chicago: The University of Chicago Press, 1962.
[2] Adrian Desmond and James Moore. *Darwin: The Life of a Tormented Evolutionist*. New York: Warner Books, 1991.
[3] Desmond and Moore. *Darwin*. p. xviii.
[4] Mark Noll. "Science, Religion, and a New Biography of Charles Darwin," *The Christian Century* 109 (August 26, 1992): 776.
[5] John Hedley Brooke, "Book Review," *British Journal for the History of Science* 25 (December 1992): 480-482.
[6] *London Sunday Times*, September 29, 1991:7.
[7] Clifford Geertz. *The Interpretation of Cultures*. New York: Basic Books, Inc., 1973.
[8] Michel Foucault. *The Order of Things: An Archaeology of the Human Sciences*. New York: Vintage Books, 1973.
[9] Peter Brent. *Charles Darwin: A Man of Enlarged Curiosity*. New York: W. W. Norton, 1981.
[10] *The Correspondence of Charles Darwin, vols. 1-7*, ed. Frederick Burkhardt et al. Cambridge: Cambridge University Press, 1985-1991.
[11] Cf. Adrian J. Desmond, "Designing the Dinosaur: Richard Owen's Response to Robert Edmond Grant," *Isis* 70 (1979):224-234; *The Hot-Blooded Dinosaurs* (London: Blond and Briggs, 1975); *The Ape's Reflexion* (London: Blond and Briggs, 1979); *Archetypes and Ancestors* (London: Blond and Briggs, 1982); *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (Chicago: University of Chicago Press, 1989).
[12] Cf. James Moore, *Post-Darwinian Controversies: A Study of the Protestant Struggle to come to Terms with Darwin in Great Britain and America, 1870-1900* (Cambridge: Cambridge University Press, 1979); *History, Humanity, and Evolution* (Cambridge: Cambridge University Press, 1989).

Book Reviews

THE BEGINNINGS OF WESTERN SCIENCE: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, 600 B.C. to A.D. 1450 by David C. Lindberg. Chicago: The University of Chicago Press, 1992. 474 pages, 116 illustrations, notes, references, index. Hardcover: $57.00, paper: $19.95.

In his address to the ASA at the 1991 Wheaton meeting, David Lindberg sketched the relationship of science and Christianity in the Middle Ages through the question of whether Christianity was an obstacle to, or basis for scientific progress. Neither view stands up to recent research, he argued, and, without the time to go into much depth then, he mentioned he was writing a book synthesizing current research on the history of science from antiquity through the Middle Ages. Here is that book.

David Lindberg is the Evjue-Bascom Professor of the History of Science and director of the Institute for Research in the Humanities at the University of Wisconsin, Madison. Perhaps most widely known among *Perspectives* readers for the volume he co-edited with Ronald Numbers, *God and Nature*, Lindberg is an Advisory Editor for *Isis* and Vice President of the History of Science Society. He has written extensively, particularly on the history of optics.

He begins by considering the nature of science, and early ideas of nature. Since it is not just centuries of accumulated fact that set modern science apart, it may not be obvious how or even if science can be traced back to antiquity. Raised on technical articles of focused content and spartan style, we might be permitted a little skepticism toward the likes of Lucretius who chose *On the Nature of Things* for a topic, and wrote in verse. But finding portents of our own thought, Lindberg argues, is not what history of science is about, and if we want to uncover the ideas and practices that lie behind modern science, we must work with a broad definition. Methodological themes of this sort are important throughout. The section on prehistory (based, perhaps unavoidably, on ethnography) employs the insightful work of Jack Goody on the distinction between oral and literate culture. Lindberg argues that philosophy and science could arise only with literacy, and that the "Greek miracle" owes much to "the emergence of Greece as the world's first widely literate culture" (p. 13).

The early chapters (2-7) trace developing views of the cosmos from Homer and Hesiod through Hellenistic, Roman and early medieval science. Lindberg introduces many thinkers, but it comes as no surprise that Aristotle gets a chapter of his own. Important not just in late antiquity, Aristotle became central once again from the 13th-century to the Renaissance. Lindberg is an expert in medieval science, and this review of science in antiquity is especially valuable for anticipating what we will need to know to comprehend later debates. Following an important chapter on science in Islam, about half the book (Chps. 9-13) is devoted to the revival of science, and learning generally, in the Middle Ages. A final chapter addresses significance for today, including such debates as whether the relation of medieval to modern science was one of continuity or discontinuity (Lindberg leans toward a discontinuity view, believing that there really was a scientific revolution).

Lindberg has written for students, the educated reader and historians. The book will also be of value to scientists, and, as Robert Richards points out in his exuberant dust-jacket comments, the book is for specialists as well as newcomers. It would indeed be good for classroom use, though I hesitate to call it a textbook. That word conjures up the image of a dry compendium of facts about what many of us imagine to be a dry period for science — but even a brief foray into this volume will reveal that neither image is accurate. In this book, the emphasis on context has ensured that the factual material all has place and purpose. While a student unfamiliar with the outlines of Western history might see it differently, I recall no point at which the text bogged down with names, dates, or details. Yet these facts must have been there in force, for I have emerged with a long list of scholars whose work I want to pursue further — a task made easier by the extensive bibliography incorporating many original works, referenced in English editions.

And as for ancient and medieval science, you will almost certainly leave this book convinced that it was a more lively, interesting, open and productive affair than previously imagined. This result is aided by the book's style. One challenge for the historian of science is providing explanations of scientific ideas — often rather foreign ideas — to readers not necessarily trained in science. Lindberg does this well, which I noticed because of his emphasis on questions now studied under physics and mathematics (thus less familiar to me than biology), and because I have read other works which did not succeed so well. I cannot stress too much how important this is to keeping the tale connected.

Because Lindberg covers so much (surprisingly, this is the first ever review of ancient and medieval science in one volume!), because of the institutional emphasis, and simply because of the great need for a better understanding of the history of science, this will also be useful for those interested in the encounter between science and Christianity. This is less a goal of the book than a consequence of the subject and of Lindberg's willingness to give due recognition to, rather than disparage, the religious context and content. Those of us unfamiliar with this history are here introduced to important and often quite unexpected strands of thought. For example, it happens

that the exclusion of the supernatural from explanation is not a new phenomenon, but characteristic of Hippocratic writings (p. 115), and rather more surprisingly, writings of 12th century Europe. Another view widespread in the 12th century was that God created, then left further developments to natural processes (p. 246). And two centuries later, Nicole Oresme suggested that passages of the Bible which seem to argue for a static earth could simply be accommodation to standard usage in speech (p. 260). Have you ever heard an argument that assumes one of these ideas or approaches to be a purely modern invention? More widely recognized is the medieval preference for syllogistic reasoning (p. 361) over experimentation. But while this is often portrayed as self-inflicted ignorance or dogmatic pig-headedness, Lindberg shows how it derives from the philosophical position that sense perceptions are not to be trusted. To observe that this view is also central to "post-modern" thought is not, I suppose, sufficient to deny its naivete or pig-headedness. But as with the other examples, it does serve to illustrate how interesting and relevant the subject matter can be, and does suggest the importance of a knowledge of history to current debates in science and Christianity. Lindberg has done us a great service by packing so much information and so many valuable ideas into so interesting and accessible a volume.

Reviewed by Paul K. Wason, Bates College, Lewiston, ME.

RELIGION AND THE NATURAL SCIENCES: The Range of Engagement by J. E. Huchingson (ed.). Orlando, FL: Harcourt, Brace, Jovanovich College Publishers, 1993. 402 pages, glossary, index. Paperback.

This book is an assembly of 48 readings by 47 different authors in contemporary natural science and the Judeo-Christian religious tradition, assembled by J. E. Huchingson of Florida International University. The papers from which these readings were taken were published between 1940 and 1991. Each reading concludes with a section on Questions for Study, Questions for Reflection, and Suggestions for Networking between different papers. The first half of the book is "an introduction to the discussion of science and religion," while the second half "deals with specific issues that arise in the individual sciences, from astronomy and physics to biology and ecology."

The advantage of this format is that the book provides a rich variety of inputs from many authors including Ian Barbour (the only author of more than one paper), H. Richard Niebuhr, Langdon Gilkey, Martin Buber, C. S. Lewis, Karl Popper, Albert Einstein, Paul Tillich, John Polkinghorne, Pierre Teilhard de Chardin, and Arthur R. Peacocke, to give a sample of the many well known authors. It can therefore serve as a typical sampler for more detailed discussion groups or seminars on science and Christian faith. The disadvantage is that the length of most papers is very short, giving only a brief encapsulation of the author's thought; only 9 papers are 10 pages or more long, whereas 21 papers are 5 pages or less.

A very wide range of perspectives is included. This could be an advantage if the book is used under knowledgeable guidance, but it could also be a disadvantage since the book is a sampler, not an integrator of the thoughts presented. I did a purely subjective evaluation of the various papers with respect to their general value for someone committed to understanding the interaction between science and Christian theology, giving grades of A (excellent), B (helpful to some extend), or C (not helpful, or raises more problems than it resolves); my scoresheet showed 9 A's, 20 B's and 19 C's.

Part 1 is entitled "The Range of Engagement" and includes seven papers on general issues involving the interaction of science and geology. The leading paper is an excellent summary by Ian Barbour on "Ways of Relating Science and Religion," which is 29 pages long, the longest paper in the book. Subsections deal with "Surveying the Possibilities," "Making Connections," and "Affirming Differences."

Part II includes five papers, is entitled "Words, Images, and Stories," and is intended "to clarify the specific tasks carried out in language in science and religion and to recognize their similarities and differences within each domain."

Part III includes nine papers and is entitled, "The Two-Storied Universe." Subsections are entitled "Principles and Problems," "Einstein and the Transcendent God," and "Miracles." It is directed toward exploring "the nature-supernature split and its implications."

Part IV includes eleven papers and is entitled, "The Cosmos," including subsections entitled, "Cosmology and Creation," "A Universe by Design?," and "Microcosmos." The papers included here "are chosen to highlight several of the discoveries of twentieth-century astronomy and physics that have contributed to the dialogue between science and religion."

Part V includes nine papers and is entitled, "Life," including subsections entitled, "Creation and Evolution," and "The Approach of Sociobiology." The papers included deal with the explanation for life. Authors range from Duane Gish to Edward O. Wilson. "Is life ... more than or different from its material composition in that each of us consists of something that is simply not totally accounted for by physics and chemistry?"

Part VI includes seven papers and is entitled, "Ecos and Gaia." The main thrust of these papers is to "illustrate the variety of ways religion contributes to a constructive revision of our understanding of the natural world."

Overall this book would be a useful addition to a library on science and Christian faith. It could also serve as a

fairly unique resource book in a course or seminar treating the various dimensions of this subject.

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

THE NON-DARWINIAN REVOLUTION: Reinterpreting a Historical Myth by Peter J. Bowler. Baltimore, MD: The Johns Hopkins University Press, 1988. 238 pages, index. Paperback edition, 1992; $12.95.

Peter Bowler, a reader in history and philosophy at the Queens University of Belfast, Northern Ireland, has written four other books on Darwinism and the history of evolution.

The first five chapters of this book focus on the long struggle and great difficulty that Darwin's theory of evolution by natural selection experienced in being incorporated into evolutionary thought. The rest of the book has separate chapters on human evolution, social Darwinism, cultural revolution, and a new historiography of evolutionism. Bowler points out that "History is not an objective factual chronicle of past events; it is an interpretation of the past by people whose perception is shaped by their position in the present."

The Non-Darwinian Revolution is quite different from the usual historical treatment of evolution. Bowler's main message is that although most modern scientists accept Darwin's theory of evolution by natural selection, few of Darwin's contemporaries did. Darwin's theory was mainly a catalyst for a transition from special creation by God to a basically non-Darwinian evolutionism. This non-Darwinian revolution was revolutionary for creationism but was non-Darwinian because it preserved and modernized the old pre-Darwinian views of orderly, goal-directed, progressive evolutionism, often through comparison with an individual as it grows to maturity.

Most of Darwin's contemporaries enthusiastically accepted the idea of evolution but rejected undirected natural selection for something more humane than survival of the fittest. Even many of Darwin's supporters did not understand or accept undirected natural selection as the sole driving force in evolution and remained faithful to some aspect of the development view. Both proponents and opponents used Darwin's name and other parts of his theory to promote versions of pseudo-Darwinian, non-Darwinian, and anti-Darwinian evolutionism. Many early biologists adopted a combination of Lamarkianism, the recapitulation theory, and the idea of directed, linear evolution. The so-called Darwinian revolution was not completed until the new synthesis in the 1930's when Mendelian genetics finally eliminated the analogy between developmental growth and evolution. This cleared the way for acceptance of natural selection as its mechanism.

Bowler's examination of the many non-Darwinian aspects of evolutionism is extensive, detailed, and multifaceted. His very thorough, careful reasoning is a strength but this much detail needed more organization to present a clear general picture. I found it more difficult to follow than other histories of evolution I have read.

This book will probably appeal more to science historians, philosophers, and sociologists interested in a detailed examination the mutual interactions between science and society rather than traditional field or lab scientists.

Reviewed by L. Duane Thurman, Department of Biology, Oral Roberts University, Tulsa, OK 74171.

ORIGINS: WHAT IS AT STAKE? by Wilbert H. Rusch, Sr. Terre Haute, IN: Creation Research Society, 1991. 71 + ix pages, index. Paperback; $8.95.

The title of this book, written by a member of the Board of Directors of the Creation Research Society, suggests an attempt to focus on the basic issues of principle, both scientific and theological, which are involved in discussions about origins. A good treatment of those issues by a Christian opponent of macroevolution would be welcome. But the present book deals with them in a quite inadequate way and disappoints the hopes raised by its title.

Ruach begins by setting out what he sees as the scope of the question of origins, and then defines some basic scientific and theological terms. "The" scientific method is described, with Francis Bacon as the authority for it. If Baconian induction is the only valid approach to scientific knowledge, then clearly a lot of people today who consider themselves scientists are operating under false pretenses. But how many scientists, or philosophers of science, would accept such a limitation? The view of science presented here is quite dated.

One illustration of the author's narrow understanding of science is the assertion that past events cannot be observed (p. 19). This is wrong, as all modern astronomers know.

The deficiencies in the book's treatment of theology are even more glaring. One of the consequences of "a liberal interpretation of the Scriptures" is said to be that "except to the theistic evolutionist, God becomes unnecessary" (p. 20). That sounds dire, but it only means that people won't believe in God unless they believe in God! The author is not willing to engage in serious *theological* discussion of theistic evolution. His way of rejecting it is to show that people such as Huxley and Simpson didn't like it. It is not clear why non-Christian evolutionists should be regarded as authoritative when they criticize theistic evolution for being theistic, or describe the fearful consequences of evolution for Christianity.

But what is "the liberal interpretation of Scripture" which supposedly leads to atheism? It seems to be any way of reading the Bible other than as straight historical chronicle. One may, of course, conclude after study that the early chapters of Genesis are an account of "history as it really happened," but it is another matter not to realize that there are other ways in which they might be true.

The discussion of "creation" itself is equally superficial. A look at the explanation of the First Article in Luther's or the Heidelberg catechisms will show that the limitation of creation to origination is not in accord with the Christian tradition. And what about the possibility that the Big Bang or biological evolution might be ways through which God has created? That is what should be "at stake" for Christians, but Rusch doesn't discuss the idea of mediated creation. For him the issue is simply "creation versus evolution" (p. 15).

There are serious theological problems which theistic evolution must face. One is to deal adequately with western Christianity's traditional ideas of original sin in an evolutionary context. The author sets out what he sees as "the most serious challenge to the whole body of Christian doctrine" in this connection (pp. 25-26). He overstates the case, however, by speaking of the fall of "perfect" humans, an unwarranted extrapolation from Genesis which has not been generally held in the thought of eastern Christianity. Furthermore, Rusch gives no hint that theologians who accept evolution have ever tried to deal with the related problems of evil, sin and death.

A variety of standard topics, including oddities of deposition, the definition of "species," fossils, apparent age, and the origin of life, is then discussed. Fossils are dismissed with the cavalier statement, on Sunderland's authority, that they "prove very little if anything" (p. 40). The "apparent age" idea is defended by arguments about what God *can* do, with no reference to questions about the goodness and intelligibility of the world which would be raised by spurious indications of age. The question of chemical evolution is disposed of with some assertions of Hoyle and Wickramasinghe.

Appendix G, on the history and work of the Creation Research Society, may be helpful to those interested in the creationist movement. The book as a whole is useful in showing the understanding of basic theological issues within that movement.

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

THE ECLIPSE OF DARWINISM: Anti-Darwinian Evolution Theories in the Decades Around 1900 by Peter J. Bowler. Baltimore, MD: The Johns Hopkins University Press. 1983. 291 pages. Index. Paperback. $13.95

Merely glancing at the title of this book, one might think it to be another critique of Darwin's theory, but such is not the case. *The Eclipse of Darwinism* is a very scholarly account of the first several decades following the publication of Darwin's most famous work. Written by a historian of science, this book covers a period from about 1859 to the early years of this century. During this time there was a great deal of controversy surrounding the concept and process of organic evolution. It was not until the amalgamation of various ideas related to evolution, in the so-called "modern synthesis," that these controversies were, for the most part, laid to rest by the scientific community.

This paperwork edition is a reprint of the 1983 hardback edition. The paperback version is not a revision, but does have a new preface and a short list of works which have appeared since the original publication in 1983.

The book contains a very detailed study of this area. Topics such as theistic evolutionism, Lamarckism, orthogenesis, mutation theory, as well as others are discussed. The book also has extensive references which include almost 30 pages of notes and a bibliography listing 19 pages of primary and 9 pages of secondary sources. Detailed study and extensive references make this book an excellent beginning point for anyone interested in this part of the history of the theory of evolution.

Reviewed by Phillip Eichman, University of Rio Grande, Rio Grande, OH 45674.

COSMOS, BIOS, THEOS: Scientists Reflect on Science, God, and the Origins of the Universe, Life and *Homo Sapiens* by Henry Margenau and Roy Abraham Varghese, (eds.). LaSalle, Il: Open Court Publishing Company, 1992. 285 pages, glossary, index. Paperback.

This book is a portfolio of perspectives on the relationship between the scientific enterprise and the religious view of reality. The approximately 60 scientists interviewed are for the most part theists or at least sympathetic to a religious view. The editors asked them specific questions about their approach to that relationship and their view on the origin of the universe, life, and man. Some answered by writing an essay; others gave their reason for not answering the questions, but most answered the questions as posed.

I was disappointed in the answers. Too many denied any relationship between religion and science. Only one, Edward Nelson of Princeton University, acknowledged the relevance of original sin in answering the questions the interviewers asked. Most who said they believed in the existence of God did so because everything fits so exactly together and there has to be a beginning which we can never investigate. The God we know in Jesus Christ appears to be absent.

For each contributor, birth-date, position, area of competence, and a short bibliography are given. Among the contributors are 24 Nobel-prize winners. The average age of the contributors is over 70 (68 if we allow two years for the preparation of the book). It is striking that among the writers younger than 70 more believe in a God than

in the older group. I would have liked to see some indication of the church (or other religious group) to which each writer belongs.

Part III of the book is a debate between atheist Antony Flew and philosopher of religion H. D. Lewis, followed by remarks by professor Meynnell. Part IV contains concluding remarks by professors Stoeger and Wigner.

The book is worth reading. It may even help to formulate certain beliefs. However, I do not expect that one will learn much more than the view of particular scientists about the questions asked. I regret that nobody mentioned the future of which Paul speaks in Rom. 8:21 — that the creation will be set free from its bondage to decay.

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

ORIGINS RECONSIDERED: In Search of What Makes Us Human by Richard Leakey & Roger Lewin. New York: Doubleday, 1992. xxii & 375 pages, 24 pages of plates. Hardcover; $25.00.

Richard Leakey and Roger Lewin, one of them one of the most well known palaeoanthropologists and the other an award winning science writer, bring us Leakey's highly personal memoirs and reflections. These prolific authors have collaborated on previous books, such as *Origins* and *People of the Lake*, and have individually authored numerous books: e.g. Leakey's *The Making of Mankind* and *Human Origins* and Lewin's *Bones of Contention* and *The Nervous System*. The present volume moves from a recounting of Leakey's pilgrimage through the fossil discoveries in Africa to his reflection on the meaning of worldwide palaeoanthropologic discoveries, primate research, genetic research, art, aesthetics, and psychology. While the book is a serious effort to present the full range of evidence for Leakey's views on the origins of humanity, it is obviously aimed at the "popular" market, in that there is no bibliography and no footnotes or traceable references of any kind. There is an extensive index, but the book would have been much more useful with full references somewhere in the work. Leakey summarizes his opponents' viewpoints, but concentrates on a positive presentation of his position. He claims the media has exaggerated his differences with Donald Johanson and, intriguingly, refuses to give us a reason for their original disagreement.

This book is billed as a reconsideration of *Origins*, published about 15 years ago, but is does so as an independent presentation of Leakey's present position, with little reference to the original publication. He still agrees that humans are not genetically driven to aggressive behavior; and denies that "evidence of bloody conflict" exists in the fossil record, at least until the rise of cities, agriculture, and accumulated wealth worth fighting and killing for. However, he notes that, after 15 years of experience, he is less inclined to *defend* truth and more inclined to *search* for truth.

Leakey confesses to a long-time passion to define and identify the origins of humanity. He rejects the current emphasis on a rapid, recent appearance of humanity in favor of a long, gradual evolutionary history and brings together evidence from fossils, genetics, the study of stone implements, art, behavioral studies of modern apes, behavioral study of modern hunter-gatherer humans, etc. into an integrated whole.

He emphasizes that evolution is entirely purposeless and by chance. There was no reason why humans — or any other particular form of life — must have resulted; although he notes (pp. 212-3) that once human evolution reached a certain point, it "led irrevocably to humanity as we know it." Culture changed the rules of evolution.

This brings us to an interesting point. Leakey states (p. xv) that he is not religious, and he develops a totally atheistic viewpoint of the origins of even the highest and most creative aspects of humanity. We are "merely the end product" (p. 276) and are not special, although he does confess "humility at the power of the human mind." (p. 335). Often, he stresses feelings that I would term almost religious — occasionally, as when viewing the great cave art and when contemplating the human mind, definitely religious. Perhaps this is the reason for his qualification of not being religious with the phrase, "at least in the formal sense" (p. xv).

His argument on evolution of the mind because of social demands seems rather circular. The mind exists because social needs provided the evolutionary pressure; the social activity of the prehumans and early humans developed because evolution gave them the mind to do so. Since Leakey quite commendably recognizes that "Palaeoanthropology has a mixture of scientific and extrescientific elements" (p. xvi), including the philosophic, would it not be conformable to the principle of parsimony (invoked elsewhere) to simply recognize that the existence of a Creator God would answer the "Why?" and free the scientist to concentrate on the "How?" of the rise of humanity?

Nevertheless, *Origins Reconsidered* is an excellent book; anyone with an interest in the subject should profit greatly from reading it. Leakey's exposition is a thorough, well thought out, and highly entertaining synthesis and defense of the "Leakey position," as opposed to what we might call the "Johanson position," that presents a clear call for an equally comprehensive and thoughtful development of the theist position. Leakey's message can only challenge evangelical Christians to replace any simplistic, off the cuff arguments with the results of some serious thinking — a valuable service, indeed!

Reviewed by Eugene O. Bowser, Reference Librarian, The James A. Michener Library, The University of Northern Colorado, Greeley, CO 80631.

THE CREATIONIST MOVEMENT IN MODERN AMERICA by Raymond A. Eve and Francis B. Harrold. Boston: Twayne Publishers, 1991. 234 pages, bibliography, index. Paperback.

Those who follow creation-evolution debate literature are accustomed to books which focus on the biblical and scientific issues involved. This new book, which is part of the "Twayne's Social Movements Series," approaches the debate from a different angle—the sociological standpoint. One author is an anthropologist, the other a sociologist, and both are from the University of Texas at Arlington. They have previously edited together a volume entitled, *Cult Archaeology and Creationism: Exploring Pseudoscientific Beliefs about the Past.*

While the book focuses on "young earth" creationism, with considerable emphasis upon its tactics and "Social Movement Organizations" (SMOs), it includes direct and indirect references to all creationists. The authors, for example, acknowledge that not all creationists believe the same things. They recognize that there are "old earth creationists" and "theistic evolutionists" (p. 4); yet, in the concluding summary of the book they refer to the "newest form of creationism," which is "more willing to accept an ancient age for the earth" (p. 191). This sort of inaccuracy could prove confusing to those who are unfamiliar with this territory. It also does a grave injustice to a long tradition of responsible scientists who believe in creation, but are not of the so-called "scientific creationist" school. This confusion is furthered by two references to Charles Thaxton. In one place he is referred to as "an old-earth creationist," "coauthor of *The Mystery of Life's Origins*," and a "fellow of the American Scientific Affiliation" (p. 130). Then later he is set forth as a prime example of "the new creationism" which is described as " ... calmer, less angry" and "more willing to accept an old age for the earth" (p. 187). It is misleading to imply that creationists who accept scientific evidence for an old earth are a "new" movement.

Despite this confusion (a rather significant one in my mind), the book offers much that is interesting and informative. There are, for example, several statistical charts which summarize the rather significant influence of evangelicals and fundamentalists in American society. One will also find dispersed throughout the book interesting bits of information such as the following.

> 25-30% of high school biology teachers believe in special creation (p. 188).
>
> 63% of 578 lawyers answering a survey circulated by the *American Bar Association Journal*, said that the First Amendment does not prohibit teaching creationism in public schools (p. 164).
>
> The Rev. Carl Baugh (whom I have heard speaking with great authority on a Christian radio program) "claims a Ph.D. in anthropology from the College of Advanced Education in Irving, Texas. This Bible College is located on the grounds of the Sherwood Park Baptist Church in an old house. It has no library or research facilities" (p. 129). Note: this conflicts with the jacket of his book, *Panorama of Creation*, which states he has a doctorate in education from Pacific College of Graduate Studies.

What is the future of this debate? These authors predict that " ... the creation-evolution conflict will continue for years to come — in fact, we expect the conflict to escalate rather than abate" (p. 173). Carrying their prognostications further, they expect evangelicalism and fundamentalism to keep growing in America, which will in turn "bring many new adherents to creationism" (p. 189). Those of us who believe strongly in the value of responsible scientific literacy within a theistic framework cannot help but wonder what type of creationism will prevail in the growing evangelical movement. I would expect these authors to say (if questioned on this matter) that any movement which wants to significantly influence society needs to organize itself with SMOs and seek to reach people at the grassroots level. The "young-earth creationists" have been doing these things quite effectively, as this book adequately documents.

This is a significant book for those who are following the currents of contemporary Christianity in America, especially as it concerns evolution-creation issues. It would also serve as a reasonable overview of the practical side of the debate as it manifests itself in North America. It should be understood that it will not help anyone who is looking for a discussion of the actual biblical, theological and scientific issues involved; nor will it further anyone's understanding of the types of creationism which reject the "young-earth creationist" position.

Reviewed by Daniel E. Wray, Pastor, Kinderhook Reformed Church, Kinderhook, NY 12106.

TIME FOR THE STARS: ASTRONOMY IN THE 1990s, by Alan Lightman. New York, NY: Viking, 1992. 124 pages, index. Hardcover, $20.00.

This book seems to be a crash course in contemporary astronomy by Lightman, a professor of science and writing and senior lecturer in physics at MIT. In the foreword, the President of the American Astronomical Society says, "This book is what I want my children to know about astronomy" (p. viii).

Yet this is not a book for children — even intelligent children who are interested in astronomy. (Would novice astronomers benefit from a graph showing the "period luminosity relation for Cepheid variable stars" (p. 52)? Why didn't the author include a glossary?) This book's audience seems to change chapter-by-chapter and sometimes even paragraph-by-paragraph.

After a whirlwind overview of the past, present, and future of astronomy and our solar system in chapter one, Lightman proceeds to discuss the "Life History" of stars, galaxies, and the universe.

Throughout the book, he offers useful — though brief — overviews of what to expect in new research in the 1990s. A table at the end of the book lists some 33 recent or proposed developments in astronomy. These developments include a proposed Orbiting Solar Laboratory (OSL) to observe the sun, which would work closely with a network of ten or more observatories world-wide for continuous monitoring of the sun. An Infrared Optimized telescope (IRO), which can detect both infrared radiation and visible light, will be built on top of a dormant volcano in Hawaii and will be operational in 1998. That year could also see the launching of a 13-ton orbiting cylinder with gold-coated mirrors that can make images of objects through x-ray light, dubbed the Advanced X-ray Astrophysics Facility (AXAF). Even in discussing new developments, though, novice astronomers might find there's too much assumed knowledge, and experts might want a more detailed discussion.

There are several good stylistic moments in this short book. Lightman calls quasars "the dinosaurs of the cosmos," which mainly died out long ago (p. 61). Later, he delivers an inspired, 250-word definition of a black hole which begins, "Now imagine taking the Earth and putting it into a giant vise, reducing its size by four times. The strength of gravity is stronger now because an object on the surface of the Earth is closer to the center of attraction ... " (p. 64).

But the style flips and flops between insightfully precise communication and textbook or government-report language. Indeed, the book began as a report to the Astronomy & Astrophysics Decade Survey Committee of the 1990s.

Ideally, *Time For The Stars* should condense the expanding universe of astronomy into a single book that can be read and enjoyed by children, adults new to astronomy, and experts seeking a brief refresher course. Unfortunately, this book suffers from a mild identity crisis, and I cannot strongly recommend it.

Reviewed by James G. Bishop, West Springfield, NH 03284

THE INVASION OF THE COMPUTER CULTURE by Allen Emerson and Cheryl Forbes. Downers Grove, IL: InterVarsity Press, 1989. 179 pages, appendix, notes, annotated bibliography, index. Paperback; $8.95.

The profound impact of television on American culture in the 50s produced a response from a concerned Christian community as to whether TV was to be servant or master. Now, four decades later it is confronted by a growing computer mentality that not only threatens the traditional understanding of man as uniquely created in the *imago dei* but also his very humanness. This book responds to this new challenge (though the above comparison is not made) from a well thought out Christian perspective. Is the computer an extension of the mind or is the mind an extension of the computer? What do we need to know about the new world of computers we live in?

The co-authors are husband and wife. Allen Emerson teaches developmental mathematics at Calvin College and is a former computer analyst with Sperry Rand Corporation and the Cancer Institute. His wife, Cheryl Forbes, is the author of many books, including *Imagination, Catching Sight of God* and *Backdoor Blessings*: she also teaches writing at Calvin College.

Emerson and Forbes did not meet the computer mentality in abstract, philosophical terms, but by noticing the personality changes in their children after watching video games. "Our primary concern should not be whether computers can or cannot be made to think like people. Rather, the central issue is how computers are changing our thinking about thought, reality, ourselves" and how we relate to others.

"This book is not a polemic against rationality or AI (artificial intelligence). Our quarrel is with the computer mentality," which "ignores or denigrates the belief that humanity is made in the image of God and insists that program is the measure of all things." AI "as a science may have much to teach us and, as such, is not anti-Christian any more than is physics or biology. Christians can share in the AI enterprise and, indeed, will have no other choice if it is our intention to be educated and do business in the world."

After two excellent chapters on "The Computer and the Brain" and "Creating Intelligence" the authors introduce case studies from Brod and Turkle to show the disorders computers bring about in the emotions and minds of ordinary people in the chapter "Adjusting to the Age of the Computer." It concludes with a summary of computer mentality's intent "to prepare the way for the coming of the first man-made, inorganic species of life on earth — *machina sapiens*."

The remaining three chapters formulate a strong Christian counter-position. In "Redefining Ourselves" the authors give careful critical review of Marvin Minsky's *The Society of Mind* to show its inadequacy. "As creatures, we are not unique by virtue of our intelligence *alone*, but the *nature* of our intelligence distinguishes us from both animals and machines" (italics added). This leads to a discussion of the role of language in understanding humanity, computers and reality, in the chapter entitled, "Standing by Words." "We become fully human only when we stand by our words. The computer mentality, however, cannot or will not take that responsibility." In the final chapter, "Preserving Our Humanity," the authors point out that computer mentality denies the existence of evil, turns the natural to the artificial, eliminates God and following the mind of Christ, deprives us of the personal relationships of life with others and fails to deal with the mysteries of life.

A concluding appendix gives some excellent practical suggestions on what we can do to counter the insidious intrusion of the computer mentality into our lives.

The authors present their position in an interesting and relevant manner. The factual material is up-to-date, well researched and fair in stating and dealing with competing views. The book is masterfully written. I highly recommend it not only for everyone who sits daily in front of a computer, but for parents, educators and pastors as well. It would make a thought-provoking text for small group study and discussion.

Reviewed by Albert C. Strong, Presbyterian minister, Retired, Silverton, OR 97381.

ETHICS IN AN AGE OF TECHNOLOGY: The Gifford Lectures Volume 2 by Ian G. Barbour. New York: HarperCollins Publishers, 1993. 312 pages, index of names. Hardcover. $35.00.

Ethics in an Age of Technology is the second volume based on the author's Gifford Lecture series at the University of Aberdeen, England, 1989-91, complementing his earlier volume, *Religion in an Age of Science* (1990). Ian G. Barbour, Bean Professor of Science, Technology, and Society, Emeritus, at Carleton College in Minnesota, has written a challenging, interdisciplinary, and well-documented study on technology, values, and public policy. While the book lacks an index of subjects, it is well-organized and written in outline form, reflected in a comprehensive 4 page table of contents. The book is divided into three parts (Conflicting Values; Critical Technologies; and Technology and the Future), and nine chapters (Views of Technology; Human Values; Environmental Values; Agriculture; Energy; Computers; Unprecedented Powers; Controlling Technology; and New Directions). Each chapter is further subdivided into sections and sub-sections, with the first eight chapters offering brief summaries in the Conclusions. In brief, this is a college text *par excellence*. The author acknowledges that many of the book's topics were discussed in Carleton College's program in Science, Technology, and Public Policy.

The central thesis of the book is the need for a contextual approach to technology, human values, and public policies to encourage more frugal life-styles, intermediate-size technologies, and post-materialist values which would contribute to resource sustainability, social justice, and a more equitable distribution of resources as well as the costs and benefits of production and consumption. Barbour tries to steer a middle course between the views of technology as a liberator and a threat. Throughout the book, the author argues for the imperative need to redirect technology from large-scale, extractive, and manufacturing toward smaller- or intermediate- scale, using renewable resources, and oriented toward information and services in the industrialized world, and toward more labor-intensive inputs in the Third World. Barbour's assessment of three critical technologies — agriculture, energy, and computers — is finely-textured, insightful, and well-documented. Throughout the book, Barbour is concerned with both industrial and developing nations, and he offers analyses and recommendations for appropriate new technologies which take into consideration the basic human need for food, shelter and health, on the one hand, as well as the quest for community and participation, on the other. Barbour is very aware of environmental degradation, resource depletion, and the concentration of economic and political power inherent in large systems (e.g. nuclear plants). Hence, Barbour argues in favor of a mix of small, intermediate, and large-scale technologies, greater ecological awareness and cost calculation which includes resource depletion, and greater citizen participation in the choice and configuration of appropriate technologies based on conservation and sustainable development.

Barbour's interdisciplinary approach to technology and public policy is adumbrated further by biblical references to human nature and the created order via process theology. Throughout the book, Barbour tries to show how the biblical view of creation supports his thesis of the need for a new, more encompassing postindustrial paradigm in which technology is employed in the service of basic human needs without dominating or exploiting nature. Barbour combines the biblical themes of stewardship of the earth and social justice and peace.

In sum, this is a thoughtful book, indispensable for anyone concerned with the interfaces and linkages between technology, human values, and public policy. Yet, in reading this book, one gets the impression that its underlying assumptions are those of the 1960s and 1970s, that is, "Back to the Future." The book cites approvingly various National and World Council of Churches documents, and is reminiscent of the Catholic Bishops' Letter on the U.S. Economy (1986). These documents reflect a presumption in favor of distribution in contrast to wealth creation. Thus, Barbour argues consistently for the need for massive transfers from Western industrial nations to the Third World. Apart from the question of the absorptive capacity for capital and technological know-how, the book fails to mention the social and cultural impediments to economic growth and modernization in the Third World. Barbour also favors the strengthening of the United Nations as a supranational force, which contradicts his thesis regarding the need for decentralization of both economic and political power.

Barbour's critique of Western materialism and consumerism leads him to such questionable prescriptions as the replacement of manufacturing by services and information. In fact, the United States (in contrast to Germany and Japan) is well on its way to becoming a second-rate power due to the erosion of its manufacturing capacity (steel, mining, automobiles, tools, machinery, appliances, electronics, textiles, etc.). The result is obvious: millions of well-paid manufacturing jobs were lost in the 1980s, even before the defense and aerospace cutbacks of the 1990s, compounded by corporate mergers, downsizing, and the transfer of manufacturing and assembly operations abroad. These well paid jobs were replaced in part by low-paying jobs in services and information. Barbour's own analysis shows that computer technology generates few highly-skilled (engineering, management), and many more low-skilled (operator), jobs. The human cost of U.S.

deindustrialization has been enormous: an estimated 12 million unemployed (including at least 500,000 homeless); break-up of families; loss of home and hearth; impoverishment; ghost towns; increased crime and alcohol, drug, and child abuse; stress; anomie; and suicide. The closely-guarded secret of a "postindustrial" society is slowly dawning on Americans, including college graduates unable to find work: the much-touted high-tech economy means that we may shuffle paper or computer print-outs, flip hamburgers at McDonald's, or shine the shoes of visiting Japanese businessmen. A service and information society, indeed.

Barbour's concepts of social justice and egalitarianism may also be less than optimal since they lead necessarily to greater concentration of power in a central government authority, which in turn endangers individual liberty and privacy, as shown by a long line of thinkers from Alexis de Tocqueville's *Democracy in America* (1835-40) to Friedrich A. Hayek's *Law, Legislation and Liberty (1973-79) and Thomas Molnar's Utopia* (1990). Despite its sometime questionable assumptions, Barbour's book fulfills its purpose of presenting an interdisciplinary approach to the perennial human dilemmas of appropriate technology, human values, and public policy choices. Written in a clear, nontechnical style, the book will appeal to wide audiences — academic, public policy decision-makers, as well as concerned citizens.

Reviewed by Oskar Gruenwald, President, Institute for Interdisciplinary Research, 2828 3rd St., Suite 11, Santa Monica, CA 90405.

WORLDVIEWS IN CONFLICT: Choosing Christianity in a World of Ideas by Ronald H. Nash. Grand Rapids, Michigan: Zondervan, 1992. 176 pages, index. Paperback.

In this book the author seeks to make available the intellectual armor needed by Christians to participate successfully in the battle of worldviews, involving "ideas, theories, systems of thought, presuppositions, and arguments." He is particularly concerned about the two worldviews most opposed to the Christian worldview: naturalism and the New Age movement. Prof. Nash is Professor of Philosophy and Theology at Reformed Theological Seminary, Orlando, and a well-known author who has dealt with a rational defense of Christianity in over twenty other published books.

This book consists of ten chapters. The first six deal with the Christian worldview and the rational tests for an acceptable worldview. Then follow chapters on the competing worldviews of naturalism and the New Age Movement. The ninth chapter returns to the specific examination of the critical Christian beliefs of the Incarnation and the Resurrection. The book concludes with a summary chapter and suggestions for further reading.

A comprehensive worldview, according to Nash, must include beliefs about God, reality, knowledge, morality, and humankind. In dealing with the Christian worldview, he points out that "Christianity simply will not make sense to people who fail to understand and appreciate the Christian doctrine of sin."

Nash proposes three major tests to be used in the choice of a worldview: the test of reason, the test of experience, and the test of practice. His entire perspective is based on the deeply felt conviction that reason and the Christian faith are not only compatible, but are intimately related. He argues that "there may be no worldview in the history of the human race that has a higher regard for the laws of logic." He does not fall, however, into the mistake of arguing that we can rationally prove "the validity of Christianity," but states clearly, "Even though no worldview can rise above logical probability, it may still be believed with moral certainty. A single proposition or system of propositions that is only probable in the logical sense may still generate certainty in the psychological or moral sense" (p. 71). With his convictions, it is not surprising that Nash feels that many well-known Christian theologians who have claimed that religion is beyond logic, such as Barth, Torrance, and Dooyeweerd, have been guilty of "pious nonsense."

Nash considers in some detail two of the major rational arguments commonly leveled against Christianity: (1) the "alleged inconsistency between what Christians believe about God and the troubling presence in God's creation of all kinds of evil," and (2) the alleged contradiction between the claim that Jesus is both true God and true man. He then returns to consider a variation of the first of these arguments: If it cannot be established that the problem of evil makes theism logically false, it can still be argued that "evil tips the scales of probability against theism."

The author is careful throughout this small book not to stray too far into the quagmires of scholastic philosophical argumentation, and shows that he is consciously writing for a general audience. He concludes by saying, "I would like to think that this book will give you enough of a basic training in worldview thinking that you can at least hold your own in your first, faltering efforts to accomplish something in the world of ideas."

There are a few places in the book where perhaps the author's desire to simplify leads him into apparently incomplete formulations of some fairly basic ideas. He refers to two contradictory classes as being "complementary," whereas the term "complementary" includes paradox but definitely excludes contradiction (p. 81). In one particular extended discussion he writes as though to "offer enough evidence" were equivalent to "prove" (pp. 88-91). One needs also to be careful to distinguish between the use of the term "naturalism" to mean that God is ruled out of any activity in the natural world (as in the worldview of naturalism), and the use of this term to mean that our normal scientific descriptions of events in the world are to be properly carried out in natural categories without invoking a constant God-of-the-Gaps (as in the operation of authentic science) (p. 127).

With so much talk and publicity about non-rational approaches to religious faith in our present world, this

book by Nash provides a needed and useful counter-perspective. It is also effective in avoiding the pitfalls often attendant on a rational approach to faith, in which the attempt is explicitly or implicitly made that the rational arguments for theism make any genuine personal faith commitment almost unnecessary.

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

THE ENVIRONMENT AND THE CHRISTIAN: What Does the New Testament Say About the Environment? by Calvin B. DeWitt (ed.). Grand Rapids, Michigan: Baker Book House, 1991. 134 pages, notes, index. Paperback; $7.95.

DeWitt is professor at the Institute for Environmental Studies of the University of Wisconsin, and director at the Au Sable Institute of Environmental Studies. He is joined by five other authors in the presentation of papers originally written in the Au Sable Forum series. Recognizing that many standard environmental arguments with respect to the environment are derived from the Old Testament, the authors here seek to spell out the implications of the New Testament, to develop a specifically "Christian" basis for environmental concern and action, and to offer a rich and full alterative to the New Age movement.

DeWitt lays the foundation for the discussion by briefly describing seven degradations of creation and citing representative Old Testament passages that are relevant: (1) land conversion and habitat destruction; (2) species extinctions; (3) land degradation; (4) resource conversion, and wastes and hazards production; (5) global toxification; (6) alteration of planetary exchange; and (7) human and cultural degradation. He then asks in concluding this section, "What does the New Testament teach about choosing between life and death, between redemption and destruction, between restoration and degradation?"

In the following chapters, the authors discuss the effect of salvation as reconciliation involving the whole creation, as well as a personal transaction between individual human beings and their Creator; the calling of the New Testament message to a pervasive stewardship for all who are redeemed; the recognition of Christ's resurrection as the vindication of creation; the significance of the New Testament teaching concerning the Kingdom of God with respect to its implications for a Christian environmental ethic; and the politics of servanthood, exemplified in the life of Jesus, leading Christians to integrate the best features of contemporary movements into a larger and more powerful movement.

In the Epilogue, De Witt argues that the New Testament provides a single answer to all questions: "Seek the kingdom." To New Testament Christians, he advises, "Behave on earth (in such a way) that heaven will not be a shock. ... Do not be numbered among those who destroy the earth!" To those of the Jewish faith, he advises, "Live in creation with the law written upon your hearts, so that everything is done in accord with God's ordinances for redeeming and healing humanity and creation." To those attracted to the New Age movement, he advises, "the New Testament provides a rich and full alternative, a 'new age' about which much has been written and believed over thousands of years — the kingdom of God." To secular readers, he advises, "Not only is the environmental crisis a human and religious one, but Christianity has important contributions to make toward the reversal of environmental destruction and establishment of ecological sustainability."

The book concludes with an Appendix giving a review of literature on environmental stewardship and the New Testament, compiled by David Wise, a graduate student in land resources at the University of Wisconsin-Madison. Wise is currently writing a thesis entitled "A Biblical Land Ethic." He concludes that the number of works treating the relationship between Christianity and the environment is increasing. This book would be a good resource for a group discussion of the implications of Christian faith for ecology. Well-intentioned attempts to bring out the implications of the New Testament message for environmental concerns may occasionally result in a somewhat forced or simplistic exegesis, but all can agree with the basic thrust of the book, "The presence of the kingdom means that Christians should order their lives in terms of the values and shape of the new and coming kingdom."

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

REDISCOVERY OF CREATION: A Bibliographical Study of the Church's Response to the Environmental Crisis by Joseph K. Sheldon. Metuchen, New Jersey and London: The Scarecrow Press, Inc. and The American Theological Library Association, 1992. 282 pages, bibliography. Hardcover.

Joseph Sheldon, a professor of biology at Messiah College (Gratham, PA), has done a great service to those interested in Christian responses to environmental issues by compiling this bibliography.

This volume is number twenty-nine in a series of bibliographies sponsored by The American Theological Library Association. It includes a brief thirty-eight page "Historical Overview" of "The Church's Response to the Environmental Crisis," followed by a topical index to entries, a listing of "Christian Organizations with a Focus on Creation" (which includes ASA), and a list of "Curriculum Materials on Creation Care." The bulk of the book consists of 218 pages of bibliography by author.

It should be noted that this is not a bibliography about science and faith issues, but rather it is about Christianity and environmental issues. Sheldon is an ASA member,

and this journal is cited at least eighty-five times in the bibliography section.

Reviewed by Daniel E. Wray, Pastor, Kinderhook Reformed Church, Kinderhook, NY 12106.

NATURE AS TEACHER AND HEALER: How to Reawaken Your Connection With Nature by James A. Swan. New York: Villard Books, 1992. 321 pages, appendix, notes and index. Paperback; $13.00.

This book is subtitled: "How to Reawaken Your Connection With Nature." A more descriptive subtitle would be: "An anecdotal apologetic for a return to shamanism, with a sprinkle of new-age pop-psychology." The author is described on the back cover as "a leader in the growing field of environmental psychology." To what extent he is representative of this field is impossible to tell.

The book is a miscellany of new-age thinking applied to environmentalism. It ranges from pantheistic nature worship, to dowsing to "sacred places," to an assortment of quasi-scientific references. Occasionally its statements are simply wild, e.g. "the Hebrews sacrificed lambs at Easter time to honor the earth god" (p. 272).

Two illustrations from the book will be sufficient to give its flavor. While "seeking inspiration" to finish the book, the author went on a camping trip with friends and his son, Andrew. He says: "Arriving at our campsite, I take out a little cornmeal and toss it in the bushes, making a gesture of respect to the place and its powers, explaining that I am there to seek inspiration to finish my book. Almost immediately an osprey flies by clutching a big fish in its talons, obviously a good omen" (p. 259). His teenage son, who had retired to his tent early, is later heard letting out "a yelp. " Upon rushing to the tent, they found "a skunk [had] crawled inside the tent and walked on top of Andrew." So he concludes, "The message from the nature spirits is very clear: Back to civilization!" (p. 259). So this is getting in touch with nature!

Christians will want to know where their belief system fits into all of this. The statement from the final chapter will make it clear: "As the Christian church looks for ways to become more ecological, it will find itself reversing centuries of discrimination and practicing side by side with shamans, wizards, witches, pagans, and their images and idols. Christ, the Virgin Mary, and the Holy Ghost can and do get along very nicely with trees, jaguars, sheaves of wheat, stones, and flowing wells" (p. 275).

Is Christianity giving such an uncertain sound that an educated man can seriously suggest this? If nothing else, this book ought to alert us to the need for a clearly-stated biblical environmentalism!

Reviewed by Daniel E. Wray, Pastor, Kinderhook Reformed Church, Kinderhook, NY 12106.

50 WAYS YOU CAN HELP SAVE THE PLANET by Tony Campolo and Gordon Aeschliman. Downers Grove, IL: InterVarsity Press, 1992. 144 pages. Paperback, $6.95.

Campolo and Aeschliman present 50 environmentally sound suggestions, most in common use by environmentalists for over 30 years. This book, however, differs from most environmental works by offering a different motivation and frequent counsel for carrying out these suggestions in a Christian manner. The authors start with "For the Love of Creation," which focuses on environmental care more as an act of worship to God and as a part of our Christian witness than on proper earth care to protect our own physical well-being or as an act of stewardship. They state that we even though "we cannot return to Eden" and that the earth will, according to prophesy ultimately be destroyed, we should do what we can.

The first of 7 sections following this introduction proposes 20 practical ways to recycle. Next are 5 suggestions each on how to be environmentally caring with water, energy, shopping, gardening, advocating proper environmental care, and resources for action.

These suggestions are practical and generally given with wise, common-sense precautions that repeatedly encourage careful research of any proposed environmental action before launching out. When working with others, including local governments and businesses, we are to "Try to understand the level at which they have grasped environmental concerns and aspirations that motivate fears that block their involvement." The authors stress that "all leadership is to be conducted in the spirit of compassion, servanthood, teachability, and camaraderie." We are to be "gracious but firm" while conducting ourselves "in a godly manner that is gentle and humble" whether or not others agree with our views. They suggest that if we start on a small scale, our plans are more likely to work well and attract others to join us. We are also advised to take photos and otherwise publicize the project and our reasons for doing it as part of our Christian witness.

50 Ways You Can Help Save the Planet is a companion volume to *50 Ways You Can Feed a Hungry World* by the same authors. Campolo, a professor of sociology, has written several books, including *How to Rescue the Earth Without Worshiping Nature*. Aeschliman, a frequent speaker on environmental issues, has written books on apartheid and Christian healing.

Biologists will be surprised to read that " ... we exhale carbon dioxide, while trees inhale it." Campolo and Aeschliman's statement that "the near-overwhelming chorus of adulation from jungle creatures in the early hours of the morning renders our best choral attempts at praise insignificant" does not distinguish between our conscious choice to sign praises to God and the largely instinctive sounds used for territorial defense, mating, and alarm by insects, birds, and other jungle creatures. They do not say how they found out that "As many as one thousand species are being eliminated from the earth every day," a figure some will question. Their use of the term "toxin" was loose and overly inclusive several times, lumping

the harmless with the harmful. If the alleged "toxins" in paint, fertilizer, and food are real, they have names that should be given.

In spite of these few blind spots, Campolo and Aeschliman have produced an inexpensive, readable book of practical suggestions that almost anyone can use to help improve our environment. More important than the suggestions themselves are the repeated encouragements to use careful foresight and an attitude of respect for humans as well as the environment when carrying out these suggestions.

Reviewed by L. Duane Thurman, Department of Biology, Oral Roberts University, Tulsa, OK 74171.

ON THE WILD SIDE by Martin Gardner. Buffalo, NY: Prometheus Books, 1992, 257 pages. Hardcover.

Martin Gardner is interested in pseudo-science, he tells us. He thinks that most scientists have no desire to waste valuable time trying to combat it. That may be so for most scientists, but I am sure that scientists who belong to the Christian community are forced to fight one or another type of pseudo-science now and again. Gardner tells us that he was an "evangelical Protestant" in his youth (p. 7), but became a philosophical atheist (p. 114). Regrettably that became a bias which shows in the book in some places.

The book consists of 3 parts: Part 1, columns written in the Skeptical Inquirer; Part 2, Reviews; Part 3, Essays. The total is divided into chapters varying in length from 2 to 11 pages, except the last chapter, which goes on for 32 pages. The book is easy to read, and I enjoyed reading it despite myself. Gardner is very outspoken and he offends easily. Many chapters have an addendum of correspondence with people disagreeing with him.

Gardner has a tendency to generalize. For example, in chapter 4 he discusses an experiment to show the power of homeopathic dilutions, which, according to the evidence Gardner quotes, was not properly handled. Gardner shows that the proper controls were not in place for this experiment. But then in the middle of discussing this experiment he apparently uses the explanations of some homoeopathists to attack homeopathy in general. Is that fair?

I happened to receive an unpublished paper from a friend, a medical doctor with a degree from a "bona fide" medical school, who for years used not only the "generally accepted" medicine (if there is such a thing), but also homeopathic medicine. He admits that no good explanation exists for homeopathy, which is a method of treating sickness by using a chemical that normally causes similar symptoms. Homeopathy is to be distinguished from isopathy, the treatment with chemicals causing the sickness. Even though thus far no proper explanation for the healing exists, experience has shown that it works. He offers an explanation. I find it remarkable that he, a practicing physician, only talks about dilutions of at most 10 to the power of 24, while the experiment Gardner describes is about a dilution of 10 to the power of 120. The so-called explanations at the bottom of p. 32 are certainly not accepted by most, homeopathic doctors who had their training at a university. Gardner should have tried to find out what they say. The example of the daughter of a homeopathic doctor on p. 35 does not mean anything. To get the New Age involved here is not fair to the New Age nor to those who will fight the New Age on religious (Christian) grounds.

When Gardner suggests a war between science and Christianity he should be more specific. After all, A.S.A. consists of scholars who want to listen to God's voice in Scripture and Nature. To suggest that Christianity is divided between Catholics on the one side and Protestant fundamentalists on the other side (p. 76) reveals an unwarranted bias, unless by fundamentalists he means something other than what he himself appears to indicate. I do believe that God created the cosmos, that Adam and Eve were our first parents. Miracles did (and, maybe, do) happen. Does that make me a "fundamentalist"? Even when I agree that most likely evolution occurred, I definitely do not want to say that (macro-)evolution is a fact.

More weak points may be found, but the book should not be read as if it is scholarly work. I like to recommend this book for spare time reading if you can stand to be offended every now and again. It is not a scholarly book, but it may reveal weak points in our reasoning, and show us where we have to be particularly careful in dealing with students.

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

REACHING FOR HEAVEN ON EARTH: The Theological Meaning of Economics by Robert H. Nelson. New York: Rowman Littlefield Publishers, Inc, 1991. 378 pages, index. Hardcover; $24.95.

The late Cornelius Van Til of Westminster Seminary once remarked that the history of philosophy is an elaboration of the parable of the prodigal son. Nelson treats economics analogously; Nelson's thesis is that the history of economic thought is an elaboration of mankind's attempt to create the messianic age on his own. He sees the goal of economics as being utopian. " If economic rationality should actually come to prevail ... men and women everywhere could hope to share in a happy enjoyment of the earth's bounties — then restored by the knowledge of modern economics"(p. 9).

Nelson asserts that economists are the new theologians. Economics deals with values and value judgements. And

since economics also deals with production, Nelson contends that economists are best equipped to serve in society's new priesthood.

Nelson contends that the various schools of economics, whether Classical or Marxist, Neoclassical, Progressive or Keynesian, have as their respective goal the elimination of scarcity. He wrongly lumps together Adam Smith's concern for improving the lot of mankind (who for a millennium had been living largely in poverty) with Marx's professedly utopian vision of creating a new world order.

Nelson traces the philosophical foundations of the various schools, showing that while they may differ as to the nature of man or the role of government in society the aim is the same, eliminating economic scarcity. What Adam Smith attempted to achieve through discovering natural law, Marx sought through restructuring ownership rights. What the Neoclassicals attempted though *laissez faire* policy, the Keynesians urged through governmental management and regulation of the market.

Some schools are more blatantly utopian than others. In the case of the Progressives, Nelson observes that most of them grew up within the parsonage; they used scientific or governmental approaches to achieve the same postmillennial dream that their fathers sought from the pulpit.

But the urge of man to create utopia through government intervention into the economy remained unsatisfied. Although the Progressive movement was largely discredited by the wholesale destruction of World War I, Keynesian economics provided a new approach and rationale for government to direct economic activity towards utopia.

Nelson uses as a framework for the progression of economic schools the contrast between what he calls the Roman tradition (both in the ancient and the Catholic sense) and the Protestant Tradition (both in the Calvinist and the rebellious sense).

He defines the Roman Tradition to be where the world is rational, systematic scientific investigation is required to uncover the rational laws of natures, progress is found in a gradual movement toward a natural and rational destiny, life is lived to achieve happiness, private property is a beneficial instrument of the common good, and pursuing one's own interest is natural and just (p. 31).

What he calls the Protestant Tradition is characterized by the belief that the human condition in this world is deeply alienated from its original and true nature. Reason is unreliable, so the ways of the world are learned not through reason, but revelation. True progress demands revolutionary transformation of human existence (p. 53).

This main structural device, seeing the history of economic thought alternating between these two traditions is artificial, contrived, and confusing. Nelson's procrustean structure runs roughshod over historical facts in several instances. Adam Smith, for example worked out of a generally Protestant, albeit liberal, perspective. Yet Nelson, seeing Smith as conservative, places him within the Roman tradition. The atheist Marx and, later, the Social Darwinians are placed within what Nelson alludes to as the Protestant tradition.

Nelson, who got his doctorate in economics at Princeton is on the staff of the Department of the Interior. He has been a Visiting Scholar with the Brookings Institute, the Woods Hole Oceanographic Institution.

Nelson's training is admittedly not in theology (p. xxvi). He apparently remedied his theological deficiency by reading theology, generally within the neo-orthodox tradition. His self-tutoring within theology is inadequate for understanding more than the main theological issues. He does a good job, however, of discussing the philosophical and theological roots of the various camps and schools of economics.

A discussion of how economics might be used within the framework of a society submitting to God's Word rather than in a pelagian manner is, unfortunately, beyond the scope of his work. Happily, he does show that the materialism we have unwittingly endorsed within our society is a result of human attempts to create utopia. Unhappily, he does not challenge the goal of material goods or present it as an idolatry in its own right. The book is a useful exposé of the secular civil religion guided by economists. We must be cognizant of the value structure underlying such a civil religion and contrast it to biblical religion.

Reviewed by Hadley T. Mitchell, Assistant Professor of Economics Huntington College, Huntington IN 46750.

THE MEETING OF SCIENCE AND SPIRIT: Guidelines for a New Age by John White. New York, NY: Paragon House, 1990. 274 pages, notes, index. Hardcover.

The author of this book, John Warren White (not to be confused with the evangelical Christian author John White), is described as "an author, editor, and educator in consciousness research and parascience." He tells us that as a youngster in the 1950s he thrived on literature of all kinds, "especially, science fiction and fantasy." In 1963 he reports that he "discovered the human potential for growth to godhood through a spontaneous mystical experience. In a moment of grace, *nirvikalpa samadhi* happened to me. Time stopped. 'I' cease to exist" (p. 246). This disappearance of the "ego," the "I," is the ultimate goal of the New Age as described by White. (It is curious that in the twenty lines of text following this description of the cessation of "I," he uses the personal pronoun "I" or "me" some 15 times!)

For a Christian involved in authentic science to read this book from cover to cover requires a high degree of discipline. There is essentially no science in the entire book, but rather an attempt to recast some Christian concepts

into the form of Eastern religion, with occasionally claimed support from various peripheral or pseudoscientific efforts. Typical is the introduction to the Appendix on "Biological UFOs" for which White claims the following "scientific" basis: "Basing his work on the etherian physics of Rudolf Steiner and the orgone energy discoveries of Wilhem Reich, Constable claims to have discovered and photographed a form of life heretofore unknown to of ficial science, although, he says, long known to occult science." So many statements in the book are simply incredible that a reviewer is tempted to simply give a list of quotes and let it go at that.

The book is divided into three main parts. Part 1 is "Science — the Ascent of Humanity," which features such "scientific" topics as enlightenment, pole shift update, firewalking, UFOs and the search for higher consciousness, the physics of paranormal phenomena, karma and reincarnation, Yoga, kundalini (Sex, Evolution, and Enlightenment), and toward a science of consciousness. Part 2 is "Spirit — the Descent of the Divine," which features such "spiritual" topics as the sparkle of the spirit, channeling, gurus, the paranormal in Judeo-Christian tradition, enlightenment and the martial arts, the Judeo-Christian tradition and the New Age, the New Age and the second coming of Christ, and the meaning of the Christ. Finally there are five appendices with special topics.

It should not be concluded from the above remarks that White embraces all of the esoteric paraphernalia of the popular New Age movement. He is quite clear, for example, that "In its worst aspect, the movement is a grab bag of superficial, trivial, irrational, and even menacing ideas, attitudes, beliefs, products, and services, all of which amount to a sad caricature and prostitution of the real thing. There is a dark side to the New Age movement .... crystal healing, aura cleansing, the Bermuda Triangle, gods from outer space, the hollow Earth theory, chakra balancing, the Harmonic Convergence, financial 'abundance' games, and pyramid prophecies" (p. xx). So it must be realized that the material described favorably by White, no matter how much it seems to be of the same stuff as these rejected aspects of popular New Age, belongs to a more sophisticated version of New Age.

White does not hesitate to state, for example, " ... parapsychology has demonstrated that telepathy, clairvoyance, precognition, and psychokinesis are real phenomena ..." (p. 128). He repeatedly inserts snatches of Christian teaching identified as part of "universal" teaching and as identical with non-Christian, usually Eastern religion, teaching: "Other names for this state include cosmic consciousness, sarmadhi, satori, mystical union with the Ground of Being, the peace which passeth understanding" (p. 129). Elsewhere he states, "Human history is a process of ascent to godhead. That process is best described, individually and collectively, as evolution. ... Discovery of 'God within' and the human capacity for cultivating that immanence is the principal theme of the New Age movement" (p. 149). In this way of thinking, Jesus Christ is only one among many.

> Buddha, Lao Tzu, Rama, and shortly after, Socrates, Plato, Zoroaster, Pythagoras, Jesus, and others demonstrated self-transcendence to the point where they could say, as Jesus did, that "I and the Father are one." ... Such evolutionarily advanced people were so far beyond the understanding of the masses that they were perceived as incarnations of God (p. 152).

Or again,

> But if the Son of Man showed us the way to that higher state of being, so have other enlightened teachers of humanity shown us the same beckoning evolutionary advance .... We have been taught by the Buddha and Krishna, Lao Tsu and Moses, Muhammad, Zoroaster, Mahavira, Quetzalcoatl, Guru Nanak .... They have differed in emphasis and cultural orientation, but the core truth of them all is the same; *Thou shalt evolve to a higher state of being and ultimately return to the godhead which is your very self, your ever-present Divine Condition prior to all conditions, names, and forms* .... I'm sure Jesus the Christ would be in perfect agreement with Gautama the Buddha, who taught his followers to work out their own salvation by steadfastly seeking truth (p. 221-223).

One reason for reading this book is to become acquainted with the type of thinking involved in the "intellectual" New Age, so that witness to others may be more informed and effective.

But another reason is to appreciate a danger: the great temptation that such New Age thinking poses for modern religious people immersed in a scientific world. The subtlety of language, the ease of shifting from one perspective to another, the charm of incorporating new visions constructed from pseudoscience and pseudotheology, are all very much a part of the challenge that faces Christians in the future. When we read in the Christian literature such phrases as the development of the sphere of the spirit expanded by modern science, a new order in which science will enrich our spiritual understanding, or a new understanding of spiritual truths based upon discoveries of modern science, we ought to reflect on the similarity between these words and those of White in his current exposition of the New Age. He repeatedly calls for "a science of the spirit," an opportunity "to see Spirit through the light of science." Christians will wish to be very careful that their own will not be misunderstood and seen as the same as those used to support New Age thinking. They will wish to be very careful in maintaining clearly the definition of authentic science and authentic spiritual thinking.

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

HEALTH PSYCHOLOGY: An Introduction to Behavior and Health by Linda Brannon and Jess Feist. Belmont, CA: Wadsworth Publishing Company, 1992. 544 pages. Hardcover; $48.75.

A new subject has been added to what psychologists think an educated person should know. I just checked a

half dozen introductory psychology texts written ten years ago and none of them had a chapter on health. By contrast, a half dozen published in the 1990s all had a chapter on health. This relevant and currently popular topic is a welcome addition to the subject matter of introductory psychology, the course most students take to fulfill general education requirements.

Not only do these introductory psychology texts devote a chapter of their valuable space to health, but a course has sprung up in the psychology curriculum given over entirely to this subject. This is not surprising with all the attention wellness and longevity are receiving in the media. The literature in this area has developed rapidly based on research done in psychology departments, medical schools, and physical education departments. Psychologists are interested not only in what people can do to promote health but in how psychology can help them do it. The high level of interest and substantial body of research on this topic justifies publications in this area.

The first edition of this book contained a rationale for the existence of the study of health psychology in the college curriculum. But, to quote the authors, "now no such rationale is necessary: Undergraduate health psychology courses have appeared at many" institutions of higher learning.

This book is not flamboyant. Its 16 chapters contain a few pictures, tables or figures, and these are all in black-and-white. Its eight-paged glossary has been placed at the end of the book (rather than in the margins), a place research indicates students seldom turn to. (The proofreader missed some spelling errors, e.g., "Each chapter *beings* with a lecture outline, p. xiii.) A measure of the vast amount of information available on this topic can be gauged by the 35 pages of references (over 1000 sources) which conclude the volume.

What sorts of topics might one expect to be included in a book on health psychology? Stress, pain, disease, exercise, diet, weight control, drugs. They're all here. Of course, you might expect to find these topics in books written by doctors or physical education scholars. The psychological angle on these topics is reflected in such chapter titles as "Identifying Behavioral Factors in Cardiovascular Disease." Included in this discussion are such factors as the type A behavior pattern and hostility.

There is a lot of useful information in this text, and it is clearly presented in just the right amount of detail. Anyone who becomes familiar with the information presented here will be quite knowledgeable about the factors related to health, wellness and longevity. Most of the students who take psychology courses or become psychology majors do not become professional psychologists. Therefore, an understanding of health psychology will probably prove more beneficial to them than an exploration of some of the other offerings in the psychology curriculum. This book provides a comprehensive and interesting guide to an area of study that is important to everyone. To quote the authors, "Nothing, not even wealth, equals health as a universal want."

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

QUALITY OF LIFE: The New Medical Dilemma by James J. Walter and Thomas A. Shannon (eds.). New York: Paulist Press, 1990. 357 pages. Paperback.

This book is a collection of thirty-two previously published articles and reports from various commissions and conferences related to the general topic of "quality of life" and medical ethics. It is divided into three parts. Part 1 (Definitional Issues) contains several articles written from various viewpoints, each attempting to define the term "quality of life." Part 2 (Applications) deals with various medical practices related to the "quality of life" of the patient. These include: Prenatal Diagnosis and Abortion, Imperiled Infants, The Permanently Unconscious Patient, Care of the Elderly, and Euthanasia and Assisted Suicide. In Part 3 (Public Policy) the editors have collected several reports from the federal government, the American Medical Association, and other organizations on topics such as withholding or withdrawing life-prolonging treatment, treatment of permanently unconscious patients, and other related topics.

The subject of this book is certainly timely and of interest to many people, even those outside of the medical community. The authors of the various papers are all recognized authorities in the area of medical ethics.

Quality of Life has a definite theological emphasis. However, this leans rather one-sidedly toward Roman Catholic theology, and this would probably limit the use of this book by persons of other religious viewpoints. That is not to say that this book is not a meaningful contribution to this area of concern. Anyone interested in further study of medical ethics would find this a useful reference.

Reviewed by Phillip Eichman, Ball State University, Muncie, IN 47306-0440.

A CENTURY OF PSYCHOLOGY AS A SCIENCE by Sigmund Koch and David E. Leary (eds.). Washington, DC: American Psychological Association, 1992. 1008 pages. Hardcover: $49.95.

A Century of Psychology as a Science is a reissue of a publication meant to commemorate the 100th anniversary of the founding of Wilhelm Wundt's experimental psychology laboratory. Wundt's lab was established in 1879 in Leipzig, Germany and is generally viewed as the first formal experimental psychology research facility. Publish-

ed first in 1985, this book got lost in one of the all-too-frequent publisher mergers and was not widely circulated. The American Psychological Association reissued it in conjunction with its centenary in 1992.

The book is a compilation of essays by renowned scientists and scholars on the history of modern psychology, and on the future of psychology in its second century.

Four sections divide this collection into meaningful units. Section I, entitled "The Systematic Framework of Psychology," outlines psychology's role as a science and its status as an academic discipline. The dominant systems of 20th century psychology are analyzed in this section which provides a convenient overview of the history of psychology. Section II is a collection of essays that outlines the development of psychology in several specific content areas such as learning, perception, personality, and social psychology. Section III, entitled "Psychology and Its Intersecting Disciplines," attempts to analyze the relationships between psychology and other related specialties like philosophy, neurosciences, evolutionary biology, and linguistics. Finally, Section IV, "Psychology in Relation to Society, Culture, and Sensibility," offers some interesting selections related to psychology's effects on society, and some rather non-traditional offerings like the chapter entitled, "Psychology and Poetry: The Uneven Dance."

Some of the highlights of this book, however, are not the aforementioned content, but the foreword, afterword, and postscript written by Sigmund Koch, one of the editors. Koch elegantly outlines some of the fact and legend associated with the "formal" founding of psychology by Wundt, and completes the foreword by tracing the development of psychology in America. He also manages, in the afterword and postscript, to "summarize" the book without merely repeating its content, and provides insight into the future of psychology.

On the whole, this book provides a good overview of the development of psychology as a science over the last 100 years. There are some fresh insights (e.g., Saul Rosenzweig's chapter that presents Freud's views on experimental psychology), as well as some traditional historical information. Those persons interested in the history of psychology will especially enjoy this publication.

Reviewed by David E. Johnson, Department of Psychology, John Brown University, Siloam Springs, AR 72761.

WHEN IS IT RIGHT TO DIE? Suicide, Euthanasia, Suffering, Mercy by Joni Eareckson Tada. Grand Rapids, MI, Zondervan, 1992. 176 pages. Hardcover: $15.99.

In a society in which medical technology has become awesomely spectacular, biomedical ethics has become increasingly complicated and important. Tada speaks to these issues with the perspective of someone who has been there. Joni is well known because of her courageous response to her quadriplegic status, which resulted from a diving accident in 1967. Many people are familiar with her autobiography, *Joni*. In this book Tada updates us on her continual struggle with her disability and then goes on to consider some of the difficult ethical dilemmas presented by modern medical technology as they bear on the subjects indicated in the subtitle of her book.

This book is not an ivory-tower discussion of ethics, but a down-to-earth presentation of what these issues look like from the perspective of people who have been there or who are still pondering the profound question of "When is it right to die?" With numerous real world, real people illustrations Joni introduces us to the world of the comatose, the wheel-chair bound, and the bedridden, as well as to the emotional suffering of victims, families, and friends of such people. She tells us of Bob, who, with his family, braved out Lou Gehrig's disease to a dignified end. And she tells us of Helen, who after a series of debilitating operations, finally asks for the respirator to be turned off. Joni sympathizes with both people — especially in the light of the contemporary proliferation of books and articles on the "right to die," publications that often reflect on and encourage suicides and euthanasia.

After a helpful presentation of definitions of various forms of "euthanasia," the author concludes, in agreement with Everett Koop, that use of a drug to alleviate suffering, even if it shortens the patient's life, is not euthanasia. However, other actions to end a life are at least questionable if not unethical. She has reservations about "slippery slope" arguments. For "right to die" issues, she expresses concern over the trend to go from unthinkable to tolerable to acceptable to legal to applaudable. For actual decision-making, she emphasizes that it is not just a personal matter. The decision concerns other people, God, and the devil.

In the concluding chapters of the book, Joni considers some of the thorny issues involved in sustaining life but not prolonging death. She concludes, again with examples of specific cases, that there are definite "do's" and "don'ts." However, we also need to consider the many different situations in which decisions must be made. For example, while life support systems are justified in many situations, there are cases where tube feeding may increase patient suffering without significantly prolonging life. She emphasizes the difference between being severely disabled and dying. Finally, she emphasizes the importance of supportive friends and family, and a faith that God cares.

This book should be read by everyone who has a loved one who is facing any of these medical/ethical situations. It is also a significant book for patients and others who are experiencing incapacitating situations. It should be in every church library. The personal testimony of an author who has been there — and still is — plus the numerous real life examples can really bring home some of the situations many people face in our time.

Reviewed by Wilbur L. Bullock, Professor Emeritus, Zoology, University of New Hampshire, Durham, NH 03824.

LET'S TALK: An Honest Conversation On Critical Issues: Abortion, Euthanasia, AIDS, Health Care by C. Everett Koop and Timothy Johnson. Grand Rapids, Michigan, Zondervan, 1992. 138 pages, paperback.

The authors of this short book are both well-known Christian doctors: Everett Koop, former Surgeon General, and Timothy Johnson, medical editor for ABC News and founding editor of the *Harvard Medical School Health Letter*. Both are highly qualified to discuss the subjects indicated in the lengthy subtitle of the book. The format of the book is a series of personal letters alternating back and forth on each issue.

In the Preface to the book the authors write:

> We have come to respect and love each other even as we have learned that we disagree on many specific subjects relating to medical ethics. However, we would both acknowledge that we have learned from each other, and that we have grown in our understanding of the human condition because of each other. We also agree that too often persons of opposing viewpoints conclude that there is room in God's love for only one of them. We write this book to demonstrate otherwise: to suggest that it is possible to disagree, sometimes vigorously, and yet acknowledge that God loves all even while we are less than perfect in this human pilgrimage. (p. 7-8).

This statement sets the tone for the discussion of all four controversial issues. Both Koop and Johnson agree that a major feature of these controversies is the extremists on both sides that make it difficult to determine truth and to decide on action. Thus while Koop believes that abortion is a serious moral issue, he accepts compromise in the case of rape, incest, the severely handicapped, or when the life of the mother is threatened. Johnson considers abortion more a medical issue and is concerned that many "prolifers" are more "probirthers" who give little thought to the well-being of the babies after birth. Therefore, he considers himself anti-abortion but reluctantly prochoice. Both authors recognize that we should not necessarily prolong dying, but that there are difficult ethical decisions in putting this into practice with specific cases.

Koop and Johnson agree on the need for Christian compassion in dealing with AIDS, and this includes the treatment of the homosexual patient who is still involved in risky behavior. Koop argues against the importance of genetic factors in causing homosexuality, while Johnson, recognizing other factors, emphasizes its importance for an accurate understanding of sexuality.

Over one third of the book is devoted to their discussion of the health care problem. Both agree that the present system is unfair, especially to the poor. (The Bible passage they use to introduce this subject is Isaiah 10:1,2). However, when it comes to solutions, Koop recognizes the injustices of our present system but worries about the government involvement of proposed changes and the costs of these alternatives. Johnson is most concerned with providing basic care for all before we worry about high technology medicine for a few. Both authors recognize the role of human greed in the problem and the need for planning and resource allocation. Their differences center around who should be the planners and the decision makers.

The book is an excellent summary of these contemporary and serious problems. In contrast to the extremists on both sides of all these issues, Koop and Johnson recognize the need for moderation and for careful, compassionate searching for fair and just solutions. I believe this is a "must" for all who are concerned about these issues, especially from the perspective of Christian honesty. We need to appreciate the ethical and moral complexity of the problems and search for biblical justice in their solutions. In the few weeks after I first read this book, I have recommended it to more than a dozen friends when one or more of these issues came up in conversation.

Reviewed by Wilbur L. Bullock, Professor Emeritus, Zoology, University of NH, 03824.

RACING TOWARD 2001: The Forces Shaping America's Religious Future by Russell Chandler. Grand Rapids: Zondervan, and San Francisco: HarperSanFrancisco, 1992. 367 pages, index. Hardcover: $18.00.

Russell Chandler, religion writer for the *Los Angeles Times*, has crafted an extravaganza of facts, interviews, and speculations by informed experts about the future of religion in the United States. Eighteen well-known experts in American Christianity, from theologically liberal to conservative, endorse the book, providing a daunting array of opinion to entice the reader to high expectations.

In Part 1 of the book, Chandler surveys changes in demographics, technology, society, education, and the government as background against which to view changes in traditional religious bodies (in Part 2). The third part of the book describes interesting innovations in denominations, congregations, and ministries that are leading the church into the 21st century.

I found the wide-ranging scope of the book to be stimulating. Chandler has done an enormous amount of research, primarily a vast number of interviews, to amass an encyclopedia of interesting facts and speculations about United States religion. The book is written in an uncomplicated journalistic style that pulls the reader quickly from page to page. Lots of information is conveyed palatably and quickly. It's like going to an exquisite French restaurant and eating exotic dishes served with McDonald's-like efficiency. Chandler's style perfectly fits the fast-paced, quality-conscious lifestyle of the end of the 20th century.

I liked the book and recommend it highly. I have already passed it along to my pastor. However, just as everyone might not fully appreciate French food served with McDonald's-like efficiency, let me share some of my struggles with the book. I spent the entire book trying to figure out who Russell Chandler was. My main conclusion is

that he is a consummate journalist, adept at presenting highly controversial and engaging topics with journalistic neutrality. He is (apparently) theologically moderate, and he walks a tightrope between conservative and liberal by describing some of the best of both sides without expressing his own opinion.

I kept asking myself, though, what is the main point? Is it simply to report the many options about religion that we are to expect in the future? Where is Chandler's personal preference? It was only in the chapter on world views (Clashing Cosmologies: Battle for the Worldview) that I felt Chandler ran up the flag that declares him a strong proponent of theologically moderate Christianity. True, he addressed religion sympathetically throughout the book — even Hinduism, Buddhism, and Islam — but the identification of himself with Christianity was muted and implied — journalistic.

In the third part of the book, though, his message finally came through loudly: "More and more Americans are reaching outside the traditional, established denominations to find spiritual identification" (p. 282). He admonished the church — through judicious journalistic reporting of successful case studies — to adapt to the modern and eschew traditional *forms* of the Christian religion, yet embrace traditional middle-road values and embody them into modern forms of worship, service, and spirituality. Recommended trends that promise to be successful in the 21st century include a church that emphasizes relationships through small groups, is needs-oriented, meets the criterion of social relevance, and is aimed at helping people.

In this book, Chandler informs, stimulates, and (despite the seeming neutrality of the journalistic style) declares a moderate theological message through his choice of subject matter. By its focus on the positive, the book inspires the reader to think hard about how to mold Christian principles in a 21st century world.

Reviewed by E. L. Worthington, Jr., Department of Psychology, Virginia Commonwealth University, Richmond, VA 23284.

WHEN WISH REPLACES THOUGHT: Why So Much of What You Believe is False by Steven Goldberg. Buffalo, NY: Prometheus Books, 1991. 216 pages. Hardcover: $24.95.

Steven Goldberg is a professor and chairman of the sociology department at City University of New York. He is the author of *The Inevitability of Patriarchy*, which is considered by one reviewer as "the most significant work on sex differences in decades." Much of the material in *When Wish Replaces Thought* has been published previously in scholarly journals such as *American Anthropologist* and *Reflections and Society*. This volume is tagged as a response to our politically correct times.

The 14 chapters of this book are divided into two parts: (1) why we behave as we do; (2) why we view the world as we do. Part 1 deals with an introduction, the death penalty, normality, homosexuality, patriarchy, athletes, and SAT scores. Part 2 considers stereotypes, astrology, feminism, Freudianism, language, abortion, and sociology. Each chapter contains endnotes; an index appears in the rear of the book.

The author states that this book is not intended to convince the reader that a certain moral or political view is correct. "Is cannot generate ought" is the guiding maxim. The author has been labelled as both conservative and liberal, and in reality, he may be a little of both. Liberals and conservatives alike will find something to dislike in this book.

Goldberg disputes the evidence for the widely accepted argument that the death penalty does not deter some crimes. The homosexual, says Goldberg, wants society to affirm his behavior as normal, but "we cannot give this affirmation" because homosexuality fails to meet the criteria for normality." In a long chapter on patriarchy, Goldberg asserts that some differences in male and female behavior are caused by physical differences. This perhaps explains why patriarchy, male dominance and male attainment are universal.

That black athletes are superior is seen by their percentages in professional sports: 80 percent of basketball players, 67 percent of football players, and nearly all boxers are black. Why? Goldberg writes that there is considerable evidence that blacks come into the world with a "physiology better suited than that of whites for development into athletes of the highest order."

Are stereotypes true? Goldberg's answer: "I predict that each stereotype tested will be found to be empirically true." Is astrology science? Goldberg answers: "astrology is about as bad science as science gets." Is Freudian theory science? "Freudian theory satisfies the logical requirements of a science" and "is capable of empirical test far greater than that to which it has been put." Goldberg also has a chapter devoted to explaining why there can be no solution to the moral issue of abortion: the failure to agree on the question of whether a fetus is a "person."

Goldberg writes in a somewhat scholarly but nevertheless lucid way. Educated laypersons will have no difficulty in following his arguments. Goldberg has no axes to grind, and he treats his material with appropriate scientific detachment. For those looking for insights on the topics discussed in this book, Goldberg will stimulate the brain cells to make a few more synaptic connections.

Reviewed by Richard Ruble, Siloam Springs, AR 72761.

MIRACLES AND THE MODERN MIND: A Defense of Biblical Miracles by Norman L. Geisler. Grand Rapids, MI: Baker Book House, 1992. Paperback.

Geisler, dean of Southern Evangelical Seminary, is very well acquainted with the work of Thomas Aquinas, which shows in the book under review. I think Geisler stresses reasoning too much, and my first reaction was that the book was too scholastic.

The writer notes that much of the book appeared in an earlier form in *Miracles and Modern Thought* (Probe 1982). In the new book the material has been completely revised, updated, and extensively supplemented.

Geisler says in the introduction to the new book: "If historic biblical Christianity is to survive and make sense to the modern mind, it is necessary to provide a reasonable explanation of the supernatural." He then tries to show in the book how everyone who does not believe in miracles is logically inconsistent. Anyone who is on the point of accepting some philosophical argument against miracles finds counter-arguments here.

The book has 12 chapters, each headed with a question. In each chapter, after one or more philosophers are chosen as an example of the unchristian way of thinking, the writer shows how inconsistent that way of thinking is. Some scientists who made philosophical statements are also mentioned and discussed.

The trouble I have with this book is that it appears that one *has* to reject secularism because it does not make sense. But a person either believes the God of the Bible, or her or she does not believe Him. No amount of reasoning for or against it will change that. If we try to argue that Christianity an enterprise based on logic, we will lose Christianity and trust in reason. The result is as bad as the theories Geisler correctly rejects.

Even though I find the arguments mentioned not convincing for an unbeliever since he wants to reject Jesus, some doubting Christians may find material here to show the inconsistency of secular thinking.

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

SLAYING THE DRAGON: Mythmaking in the Biblical Tradition by Bernard F. Batto. Louisville, KY: Westminster/John Knox Press, 1992. viii + 248 pages, indexes. Paperback: $15.99.

Does the Bible use mythic language as a literary device or is the Bible mythic to the core? This is a fundamental question in our understanding of the Bible, and "never the twain [the two sides of this question] shall meet" — except in mortal combat. However, a truce might be in order for this book.

Batto's thesis is " ... myth is one of the chief mediums by which biblical writers did their theologizing," and it "permeates virtually every level of biblical tradition from the earliest to the latest" (p. 1). He declares that "mythopoeic speculation" is used for some of their "most profound theologizing." While he does not deny oral aspects of myth, his approach stresses the "imaginative or literary aspects."

Unlike so many writers, Batto recognizes the ambiguity of the word "myth," extensively discusses its meaning, and gives his own definition: *"a narrative (story) concerning fundamental symbols that are constitutive of or paradigmatic for human existence* (p. 11, emphasis original)." Mythopoeism is mythmaking. By speculation he is emphasizing that it is a *"conscious, reflected* application of older myths and mythic elements to new situations" (p. 13, emphasis original). The myth makers were "involved in rethinking the basic values of humankind as understood from their societies' perspectives ... "(p. 40).

Batto assumes the basic validity of the Documentary Hypothesis although he admits that the "source" he is working with, the so-called Yahwist or J, is difficult to actually delineate at times. To his credit, he does avoid the old "cut and paste" approach that many still identify with the theory, stressing instead that P reused and reworked J into a new composition in which P is essentially the author (p. 74).

This is a scholarly book, with 43 pages of notes and 16 pages of indexes: Scripture, foreign words, authors, and subjects. The author is a well known scholar in the field. The introduction contains an extensive discussion of the history, definition, and nature of myth. The argument of the book begins with mythopoeic speculation in Babylon, and continues with "The Yahwist's Primeval Myth," the revision by the priestly writer (P), Exodus as a myth and the history of its development, and the use of Egypt and Gog as mythic symbols in Ezekiel. After a conclusion (summary), he develops his ideas that the New Testament is highly mythic also.

In contrast to the traditional interpretation of Gen. 2-12 as a fall from original perfection, Batto conforms it to the Babylonian *Atrahasis* as a story about *"continuously improved"* (emphasis original) creation by a inexperienced, fallible, and experimenting God who is forced to rethink and modify his efforts by the continuing failure and rebellion of the humans. The serpent is telling the truth and Yahweh doesn't want man to usurp divinity.

Unfortunately, this historical critical approach too often bears a striking resemblance to the "creation science" literature; there are numerous assumptions used as the basis for "scientific proof," and the most tenuous connections and similarities are triumphantly hailed as conclusive. For an excellent criticism of the underlying philosophy and methodology of the historical critical approach, (and hence the facile assumptions of *Slaying the Dragon)* see *Historical*

Criticism of the Bible: Methodology or Ideology? by Eta Linnemann, the noted student of Bultmann who deserted that school for evangelical Christianity.

However, Batto has expertly presented a lot of incontrovertible data along with his liberal critical school approach. Conservative Christians shouldn't be entirely put off by Batto's assumptions that the meaning of the story is entirely what the human theological genius intended when he brilliantly reworked old myths to properly reflect the beliefs of his people. There are still a lot of insights and keys to understanding the text to be found. The suggestion that Adam and Eve's shame at their nakedness was because it put them in the same category as the lower animals is quite convincing. Another example is the play on words between the shrewdness ('arum) of the serpent and the nakedness ('arummim) of the people. Both are explained as part and parcel of their rebellion against God, and God addresses both in his judgment. Another point to ponder: could the figure of Gog really be intended as symbolic and *not* be intended to refer to a specific historical nation? That would fit in a book with lots of symbolism and would be consistent with specific points in the Biblical text. It would also wreck untold numbers of end-time scenarios being promoted by "prophetic" preachers!

All in all this is a very interesting and important book by an established scholar for those who have the background and will to engage it seriously.

Reviewed by Eugene O. Bowser, Reference Librarian, James A. Michener Library, The University of Northern Colorado, Greeley, CO 80639

AND THE ONE BECAME TWO by J. Edward Finn. New York: Vantage Press, 1992. 132 pages. Paperback; $10.95.

Finn retells the early chapters of Genesis as he interprets them in the light of his own speculation, with heavy reliance on the zodiac, number symbolism, the writings of occultic groups, and Egyptian religion, albeit Egyptian religion as he determines it "actually was." Although New Age devotees will feel quite comfortable with his approach, he takes a dim view of "these pretty wild denominations" (p. 74). His approach is well typified by Ch. 10 "The Tarot," in which he writes " ... the story of Osiris, was never found recorded in a completed state — with the Horus ending added — until now" (p. 105). He "discovered" it while studying the symbolism on a deck of Tarot cards only "last week" (p. 105)!

His main thesis is an amalgamation of Genesis and Egyptian religions, which were talking about the same events! The Egyptians dealt with principles, the Hebrews with people. Osiris was not a person, he was principle. Osiris represents the person or people from Egypt, whoever he or they were. "When Adam "screwed up," Osiris was killed. When Adam was later created in the image of God, Osiris was resurrected as the law for righteousness. The final return to the original state was the "seed" of Osiris and Isis (the woman) or Horus *who was Christ*" (pp. 48-49, emphasis original). Throughout this book, everything inconvenient in either Genesis or the Egyptian traditions is simply rejected as "not original."

The whole work is rife with uncontrolled and unverified speculation, confidently expressed as self evident fact; the yield is pseudoscience at its most obvious. You can safely pass this book up.

Reviewed by Eugene O. Bowser, Reference Librarian, The James A. Michener Library, The University of Northern Colorado, Greenley, CO 80639.

ARCHAEOLOGY AND BIBLE HISTORY by Joseph P. Free and Howard F. Vos. Grand Rapids, MI: Zondervan Publishing House, 1992. 314 pages. Paperback.

The first edition of this book was written by Joseph P. Free and is dated 1950. This present volume has been expanded by one of Free's students, Howard F. Vos, and constitutes a third revision. Free was a teacher of archaeology at Wheaton College, and he also excavated the city of Dothan. Vos, a teacher of history and archaeology at The King's College, has written part or all of 23 books on archaeology. Both Free and Vos approach the subject from an orthodox Christian perspective which they identify as the "view of those who hold to the fundamentals of the faith."

In preparing this revision, Vos stuck to Free's outline, theological position, and chronological framework (from creation to the early church). Vos states that the bibliography which appeared in the fourteenth printing of the 1976 edition has been almost totally replaced. That being the case, it is somewhat surprising to discover that only 22 of the 85 bibliographical references (26 percent) have a publication date after 1976. The book's 29 chapters are helped by the inclusion of one chart, 11 maps, 49 illustrations, and an index.

As the title indicates, this book traces Bible chronology and shows how archaeological discoveries illuminate and confirm the events of biblical history. The main events from the Old Testament, the New Testament, and the intertestamental period are summarized. The coverage is cursory and introductory rather than extensive and advanced. The book aims to be "practical and helpful" and will appeal more to pastors, Sunday School teachers, college students and laypersons than to professional archaeologists. Free's hope is that Bible teachers can more effectively deliver their messages by illuminating them with illustrations from archaeology.

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

JESUS AND THE COSMOS by Denis Edwards. New York: Paulist Press, 1991. v + 115 pages. Paperback; $6.95.

Denis Edwards is an Australian priest and theologian; his other books include The Human Experience of God, What Are They Saying About Salvation?, Called to be Church in Australia, and A-Z of Bible Study Books and Commentaries. In Jesus and the Cosmos, he sets himself the task of using a theological perspective "in the light of the great Christian tradition" to respond to the environmental crisis currently facing the earth. He states (p. 5), "I think it is important to develop the intrinsic interrelationship between creatures of redemption, and between the historical Jesus and the cosmic Christ." However, this is a book of philosophy, not of theology; at least, it is not the theology of "the great Christian tradition" which is rooted and grounded in Holy Writ. There is practically no reference to Scripture, except in chapter 4 where he synthesizes the Gospel accounts. His approach is to accept science and combine it with philosophical speculations, including such New Age ideas as the Gaia hypothesis (pp. 32-33) and the syncretism of his statement on p. 73: "The notion of Jesus as absolute Savior should not be understood in such a way as to deny that other religious traditions and figures may be true meditations of God's grace." He views God as "the one primordial ground of all being" (p. 24).

He follows Karl Rahner in developing such ideas as "the incarnation as the summit of the plan of creation" which "would have occurred even if there had been no sin (or) need of salvation from sin" (p. 73), the "human spirit — in death ... becomes pancosmic" (p. 86), and "Jesus as the outcome of evolutionary history" (p. 70). He understands "God as the dynamic power which enables evolutionary change to occur" (p. 36). In evolution, "the creature is itself empowered to an 'active' self- transcendence" (p. 37), and " ... human beings are the cosmos come to self-awareness"(p. 28).

Thus, Jesus and the Cosmos is squarely in the midst of a growing trend in current thinking: the acceptance of Eastern modes of thought and the acceptance of philosophy and science as the basis for determining ultimate truth. It presents a fundamental conflict with the approach of traditional evangelical Christianity. In spite of often familiar sounding statements and "good ideas" in this school, the differences involve our most basic understanding of God and His revelation to us.

This, then, forms the grid through which he filters the story of Jesus. Ultimately, we will choose between these contrasting spiritualities, either deliberately or unconsciously through the infiltration of concepts oft heard but not carefully examined. One cannot serve two masters.

Those to whom this mind set and approach to spirituality V appeal will enjoy the book. Others who are unfamiliar with this approach may want to read it for "current awareness." However, most of us can pass it up.

Reviewed by Eugene 0. Bowser, Reference Librarian, James A. Michener Library, The University of Northern Colorado, Greeley, CO 80639.

G. K. CHESTERTON AND C. S. LEWIS: The Riddle of Joy by Michael H. Macdonald and Andrew A. Tadie (eds). Grand Rapids, MI: William B. Eerdmans Publishing Company, 1989. 304 pages. Hardcover; $18.95.

This book comes out of the "1987 Conference to Celebrate the Achievement of G. K. Chesterton and C. S. Lewis" in Seattle sponsored by Seattle University, Seattle Pacific University and the Intercollegiate Studies Institute. Seventeen contributions from leading Chesterton and Lewis scholars are edited by Michael Macdonald, professor of European studies and philosophy at Seattle Pacific University, and Andrew Tadie of the English Department at Seattle University.

Our vastly increased twentieth century knowledge and expanding technology have also increased the borders of our ignorance. Much of life remains a mystery. As early as the Renaissance, John Donne observed "Mysteries/ Are like the sun, dazzling, yet plain to all eyes." G. K. Chesterton and C. S. Lewis both felt this paradox. G. K. Chesterton wrote, "We all feel the riddle of the earth without anyone to point it out. The mystery of life is the plainest part of it." And C. S. Lewis wrote in *Mere Christianity* that reality "is usually something you could not have guessed ... Christianity ... has just that queer twist about it that real things have." Both men, then, "felt the riddle of the earth" and as "possibly the two most effective twentieth-century apologists for Christianity" "came to believe that its name is Joy."

The essays are divided into five sections on the theme. Section one is entitled, "Riddling Remembrances From Those Who Knew Them." It takes an Englishman to know one and besides, who uses English better than an Englishman, so Christopher Derrick's opening chapter on "Some Personal Angles on Chesterton and Lewis" with his droll wit is both masterful and charming. He warns against idolizing these men; points out that they are both fun to read, had a zest for life and great imaginative powers. Unfortunately, in this reviewer's opinion Walter Hooper's contribution on "C. S. Lewis and the C. S. Lewises" is substandard to the other essays, immature and unworthy of his mentor. It provides an inkling as to why Hooper's relationship to C. S. Lewis and his works is being questioned (See the review of *The C. S. Lewis Hoax* by Kathryn Lindskoog, *Perspectives on Science and Christian Faith*, Vol. 41, No. 3, Sept. 1989, p. 190). Fortunately "The Legendary Chesterton" receives better treatment from Ian Boyd. James M. Houston gives a straightforward, helpful overview of "The Prayer Life of C. S. Lewis."

Section two is entitled "Spelling the Riddle: Literary Assessments." Thomas T. Howard contributes "Looking Backward: C. S. Lewis's Literary Achievement at Forty Years' Perspective" and Wm. Blissett writes on "G. K. Chesterton and Max Beerbohm." When occultism is on the rise, the discussion of C. S. Lewis's struggle with "the lust of the occult" is helpful in Evan K. Gibson's, "The Centrality of Perelandra to Lewis's Theology."

Section three is about "Living the Riddle: Their Social Thought." From the three essays of this section two conclusions are worth quoting. "Chesterton the true Victorian

would admire Allan Bloom's *The Closing of the American Mind* for its insistence upon our need to regain our historic roots and for its call for intellectual ... and moral virtues" (p. 159). "As long as modern people desire only material success, maintain their Faustian quest for growth, and continue their worship of mammon, the social and economic propositions (Distributionism) of G. K. Chesterton and Hilaire Belloc, though clearly relevant, will never succeed" (p. 190).

Section four is on "Proclaiming the Riddle: Their Apologetics." This section demonstrates the effectiveness of these two as defenders of the Christian faith. Their methods deserve study and emulation. Example 1: G. K. Chesterton debated in such a manner that he was always held in the highest regard and admiration by his opponents. Example 2: G. K. Chesterton instinctively understood that the apologist must "begin in the nonbeliever's front yard, rather than in his own backyard" (p. 235). Example 3: C. S. Lewis had an unceasing focus on Jesus Christ and pointing people to Him.

Section five is "Pursuing the Riddle of Joy." In this concluding section, Peter J. Kreeft's treatment of "C. S. Lewis's Argument from Desire" is exceptional both in clarity and inspiration. It is an approach that ought to be more widely used in Christian apologetics. Janet Knedlik's "Derrida Meets Father Brown: Chestertonian 'Deconstruction' and that Harlequin 'Joy'" is brilliant, but the tight involved logic will doubtless lose some readers.

Any serious defender of the Christian faith should not be without this book with its insightful review of G. K. Chesterton and C. S. Lewis's relevance to our skeptical age.

Reviewed by Albert C. Strong, Retired, Silverton, OR 97381. ❑

Letters

The Big Bang And The Big Crunch

I wish to stimulate discussion of the fascinating philosophical and theological implications of the scientifically renowned Big Bang (Einstein-Freidmann) theory of the origin of our universe. Many of us who affirm both God and good science are interested in serious thoughts concerning such cosmic issues.

For instance, discussion might begin with why so many theists who believe that our universe was initially created in the absolute sense by God favor the Big Bang model in which our expanding universe will not eventually contract, while so many materialists favor the "Big Crunch" Big Bang model in which our universe was never created in the absolute sense but rather is infinitely old and has been oscillating eternally, in and out from each Big Bang.

While I dispute the "Big Crunch" and contend that our universe will not contract (our universe being, in my view, only the latest in an infinite series of temporal or non-eternal Big Bang creations), I also argue that an oscillating "Big Crunch" universe might be compatible with the idea of absolute creation of our universe by God. That is, it may be that God created our universe in the absolute sense, say, many centillions of oscillations ago, and it seems sensible enough to suggest, in view of the scientific principle of entropy, that each oscillation has been, say, an inch shorter than the preceding one. Eventually, then, in that model our universe will become one inert, cold and dead mass; over subsequent eons it might dissipate from existence entirely. Long before that occurs, in some part of infinity very distant from that lifeless mass, might come the brilliant burst of a new Creation, to evolve in its own unique way, after its own absolute beginning in the context of an infinite series.

However, in connection with materialists who uphold the view that our universe was never created in the absolute sense by God and has been oscillating eternally, in and out from each Big Bang, I realize that, in regard to my modest suggestion that each oscillation might be an inch shorter due to entropy, logically such materialist must vigorously dispute even that inch, and with it, even the principle of entropy itself. They must admit that, in the context of eternity, logically such a gradually diminishing, infinitely old universe would have become inert centillions of eons ago. Yet stubbornly they hope that the final great repudiation of theism will occur upon scientific acceptance of the view that our universe has been oscillating eternally, a view in which not even the slightest reduction in length of oscillations can be admitted as due to entropy — and in which, by the way, scientific acceptance of the principle of perpetual motion must necessarily occur also, for clearly an eternally oscillating universe represents perpetual motion.

Therefore it might astonish some readers that I submit that, contrary to the said hopes of materialist in this connection, theism will continue even if evidence surfaces that ours is an eternally oscillating universe. After all, numerous Christians and others over the centuries have believed in and eternal universe existing with an eternal God. In fact, my favorite theologian, William Newton Clarke (1841-1912) of Colgate University, who taught the great religious liberal Harry Emerson Fosdick, so believed.

Robert E. Crenshaw
Route 4, Box 1703
Laurens, SC 29360-9437

(Letters continue on p. 218)

On Murphy's Critique of *Darwin on Trial*

In the March 1993 issue of *Perspectives*, a lengthy critique of *Darwin on Trial* appeared, written by Dr. Nancey Murphy of the faculty of Fuller Theological Seminary (p. 26-35). It appears that a number of things could be said in response to this critique. Dr. Murphy's credentials are impressive.

Personally, I had found the book interesting and helpful. On the dust cover of the book there are a number of evaluations by several writers with earned doctorates in fields of expertise. I have read Dr. Michael Denton's book, *Evolution: A Theory in Crisis*. I would just quote his comments from the dust cover:

> *Darwin on Trial* is unquestionably the best critique of Darwinianism I have ever read. Prof. Johnson combines a broad knowledge of biology with the incisive logic of a leading legal scholar to deliver a brilliant and devastating attack on the whole edifice of Darwinian belief. There is no doubt that this book will prove a severe embarrassment to the Darwinian establishment.

I was impressed with Dr. Denton's thoroughness and integrity.

Above the Introduction, Dr. Murphy states: "Such a book, being one of many, would excite little attention were it no fore the fact that the author is an expert in legal reasoning .... " Actually, I would disagree that this is "one of many." From my observation, I believe there are not many books which show that the reasoning presented in favor of evolutionary biology is defective.

Murphy describes Johnson's arguments as dogmatic and unconvincing, but I would describe them as realistic and honest. Murphy also criticizes Johnson by saying that he does not adequately understand scientific reasoning. Maybe I don't either. But even back in my high school biology class we were taught, "You accept as truth what you observe."

The Mystery of Origins: Reassessing Current Theories (Thaxton, Bradley, Olsen: 1984) says this: "For some, this lack of observation entirely removes the question of life's origins from the domain of legitimate science" (p. 6). In another context, George G. Simpson has observed that, "It is inherent in any acceptable definition of science that statements that cannot be checked by observation are not really about anything ... or at the very least they are not science."

Arnold Claassen
603 S.E. 2nd Street
Newton, KS 67114

On Rust's Critique of Siemens

Dr. Phillip F. Rust is properly concerned about the secular humanists' attack on the Bible (Letters, March 1993). They have created a vast dump of toxic material poisoning the intellectual and spiritual environment. Dr. Henry Morris and other "creationists" are working hard to dissolve the noxious heap. The problem is that they are dumping acid on a mixture containing mostly cyanides and heavy metal ions. Their endeavors appear to reduce the size of the pile. But their effort produces as well many immediate fatalities, and exacerbates a multitude of serious long-term problems. So the first need is to end the application of "creationist" acid.

My analogy may seem harsh, but it is accurate. Rust has ignored the obvious in his defense of Morris, namely that almost every attack on the first chapters of Genesis by the atheists is against a young-earth "creationist" interpretation. In demonstrating the incoherence of "creationism," I am taking away a major portion of the basis of the materialists' attack. My apologetic effort is not as spectacular as a public debate, not as impassioned as the Elijah-like "we alone remain" posturing. But it also does not sacrifice truthful statement to the point-scoring sophistry of forensics.

Rust also ought to consider the effect of "creationist" teaching on young men and women brought up in biblically-centered churches. As a child and undergraduate, I was taught that creation was recent. I read and believed Price. In a secular graduate school, I began to read the scientific journals. I discovered, for example, that radioactive dates could at most be modified by a factor of two or three, but not by six orders of magnitude. I thank God that he held me steady, showing me that my faith had to be based on what his Word said, not on what his children claimed it said. In contrast, Dr. Ronald L. Numbers (*The Creationists*, Knopf, 1992, p. xvi), confronted with the Yellowstone fossil forests, moved to unbelief. He is not alone (see p. 279, for example).

Rust is egregiously wrong in crediting Morris with "attempting to reconcile modern science with the Bible." Morris rejects current science — unless he can twist it to his purposes — in favor of "Baconian" science, along with a deistic God-of-the-gaps "origin science." The "lord-chancellor" methodology is mere induction, simple generalization. It does not fit quantum mechanics or its predecessor theories, relativity theory, electro-magnetic theory, or even the work of Newton. One might emulate Procrustes and fit Galileo or Kepler into a "Baconian" bed. But any later physicist can no more be forced into a "Baconian" mold than Arnold Schwartzenegger can be fit into a sandwich bag. All the more recent theoreticians provide logico-mathematical models that go beyond every form of generalization.

Indeed, the "creation scientists" are not even "Baconian." Although quaintly confused about the way experience generates knowledge, Bacon insisted that only observation gives rise to science. Yet no one can point to the empirical base that produced "creationism." And when "scientific creationists" are asked what observations can falsify their view, they consistently respond, "There are none." Clearly, their view most closely resembles the deductive scholasticism against which Bacon railed.

David F. Siemens, Jr., Ph.D.
2703 E. Kenwood St.
Mesa, AZ 85213-2384

WHAT EXACTLY IS THE AMERICAN SCIENTIFIC AFFILIATION?

The American Scientific Affiliation (ASA) is a fellowship of men and women of science who share a common fidelity to the Word of God and to the Christian Faith. It has grown from a handful in 1941 to a membership of over 2,500 in 1990. The stated purposes of the ASA are "to investigate any area relating Christian faith and science" and "to make known the results of such investigations for comment and criticism by the Christian community and by the scientific community."

HOW DO I JOIN THE ASA?

Anyone interested in the objectives of the Affiliation may have a part in the ASA. Full, voting membership is open to all persons with at least a bachelor's degree in science who can give assent to our statement of faith. Science is interpreted broadly to include mathematics, engineering, medicine, psychology, sociology, economics, history, etc., as well as physics, astronomy, geology, etc. Full member dues are $45/year.

Associate membership is available to anyone who can give assent to our statement of faith. Associates receive all member benefits and publications and take part in all the affairs of the ASA except voting and holding office. Associate member dues are $40/year.

Full-time students may join as Student Members (science majors) or Student Associates (non-science majors) for discounted dues of $20/year. Full-time missionaries are entitled to a complimentary Associate membership.

An individual wishing to participate in the ASA without joining as a member or giving assent to our statement of faith, may become a Friend of the ASA. Payment of a yearly fee of $45 entitles "Friends" to receive all ASA publications and to be informed about ASA activities.

Subscriptions to *Perspectives on Science & Christian Faith* only are available at $25/year (individuals), $35/year (institutions) and $20/year (students).

MEMBERSHIP/FRIEND OF ASA APPLICATION/SUBSCRIPTION FORM

(Subscribers complete items 1-3 only)

American Scientific Affiliation, P.O. Box 668, Ipswich, MA 01938

1) Name (please print) _____ Date _____

2) Home address _____

_____ Zip _____ Phone _____

Office address _____

_____ Zip _____ Phone _____

3) I would prefer ASA mailings sent to: ❑ home ❑ office

4) Place of birth _____ Date of birth _____

Marital status _____ Sex _____ Citizenship _____

Is spouse a member of ASA? _____ Eligible? _____

5) ACADEMIC PREPARATION

Institution	Degree	Year	Major

Field of study (major concentration) _____

Area of interest (20 character limit) _____

Recent publications _____

Please complete back of this form ☞

WHAT DOES THE ASA BELIEVE?

As an organization, the ASA does not take a position when there is honest disagreement between Christians on an issue. We are committed to providing an open forum where controversies can be discussed without fear of unjust condemnation. Legitimate differences of opinion among Christians who have studied both the Bible and science are freely expressed within the Affiliation in a context of Christian love and concern for truth.

Our platform of faith has four important planks, listed on the back of this membership application.

These four statements of faith spell out the distinctive character of the ASA, and we uphold them in every activity and publication of the Affiliation.

WHY MUST THERE BE AN ASA?

Science has brought about enormous changes in our world. Christians have often reacted as though science threatened the very foundations of Christian faith. ASA's unique membership is committed to a proper integration of scientific and Christian views of the world.

ASA members have confidence that such integration is not only possible but necessary to an adequate understanding of God and His creation. Our total allegiance is to our Creator. We acknowledge our debt to Him for the whole natural order and for the development of science as a way of knowing that order in detail. We also acknowledge our debt to Him for the Scriptures, which give us "the wisdom that leads to salvation through faith in Jesus Christ."

Church Affiliation _____

What was your initial contact with the ASA? _____

If you are an active missionary on the field or on furlough or a parachurch staff member, please give the name and address of your mission board or organization.

Name _____

Street _____

City _____ State _____ Zip _____

I am interested in the aims of the American Scientific Affiliation. Upon the basis of the data herewith submitted and my signature affixed to the ASA Statement below, please process my application for membership.

STATEMENT OF FAITH

I hereby subscribe to the Doctrinal Statement as required by the Constitution:

1. We accept the divine inspiration, trustworthiness and authority of the Bible in matters of faith and conduct.
2. We confess the Triune God affirmed in the Nicene and Apostle's creeds which we accept as brief, faithful statements of Christian doctrine based upon Scripture.
3. We believe that in creating and preserving the universe God has endowed it with contingent order and intelligibility, the basis of scientific investigation.
4. We recognize our responsibility, as stewards of God's creation, to use science and technology for the good of humanity and the whole world.

Signature _____ Date _____
(required for Member, Associate Member, Student member status)

Amount enclosed _____ Category _____

Please mail to: American Scientific Affiliation, P.O. Box 668, Ipswich, MA 01938

OTHER RESOURCES AVAILABLE FROM ASA

Teaching Science in a Climate of Controversy is a 64-page book that guides science teachers in presenting origins with accuracy and openess. (Now expanded in its 1993 (4th) printing!) It is available from the Ipswich office for: $7.00/single copy; $6.00/2-9 copies (sent to same address); $5.00/10 or more copies (sent to same address).Shipping included on prepaid orders.

Gift subscriptions to *Perspectives on Science & Christian Faith* are also available. Give the gift of challenging reading for $20/year.

Please enter gift subscriptions for:

Name _____

Address _____

City _____ State _____ Zip _____

Name _____

Address _____

City _____ State _____ Zip _____

All rates and conditions subject to change.

We believe that honest and open study of God's dual revelation, in nature and in the Bible, must eventually lead to understanding of its inherent harmony.

The ASA is also committed to the equally important task of providing advice and direction to the Church and society in how best to use the results of science and technology while preserving the integrity of God's creation.

AS A MEMBER YOU RECEIVE:

- ASA's bimonthly Newsletter.
- ASA's science journal, *Perspectives on Science & Christian Faith*, the outstanding forum for discussion of key issues at the interface of science and Christian thought.
- Discount on *Contemporary Issues in Science & Christian Faith: An Annotated Bibllgraphy*, the ASA Resource Book — a catalog of science books and tapes on current issues of concern.
- ASA's Membership Directory.
- Opportunities for personal growth and fellowship, through meetings, conferences, field trips, and commissions.
- *Search: Scientists Who Serve God*, an occasional publication relating current trends in science and the people involved in them.

* * * * *

THE CANADIAN SCIENTIFIC & CHRISTIAN AFFILIATION was incorporated in 1973 as a direct affiliate of the ASA, with a distinctly Canadian orientation. For more information contact:

Canadian Scientific Affiliation
P.O. Box 386
Fergus, Ontario N1M 3E2 CANADA

The American Scientific Affiliation

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

Canadian Scientific & Christian Affiliation

A closely affiliated organization, the Canadian Scientific and Christian Affiliation, was formed in 1973 with a distinctively Canadian orientation. The CSCA and the ASA share publications (*Perspectives on Science & Christian Faith* and the *ASA/CSCA Newsletter*). The CSCA subscribes to the same statement of faith as the ASA, and has the same general structure; however, it has its own governing body with a separate annual meeting in Canada.

LOCAL SECTIONS

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

Central California	Chicago-Wheaton	Delaware Valley	Eastern Tennessee	Guelph, ONT
Indiana-Ohio	New England	NY-New Jersey	North Central	Oregon-Washington
Ottawa, ONT	Rocky Mountain	St. Louis	San Diego	San Francisco Bay
South Central	So. California	Southwest	Toronto, ONT	Vancouver, BC
Virginia-Kentucky	D.C.-Baltimore	Western Michigan	Western New York	

INDICES to back issues of *Perspectives* are published as follows:

Vol. 1-15	(1949-1963),	Journal ASA	15,	126-132	(1963);
Vol. 16-19	(1964-1967),	Journal ASA	19,	126-128	(1967);
Vol. 20-22	(1968-1970),	Journal ASA	22,	157-160	(1970);
Vol. 23-25	(1971-1973),	Journal ASA	25,	173-176	(1973);
Vol. 26-28	(1974-1976),	Journal ASA	28,	189-192	(1976);
Vol. 29-32	(1977-1980),	Journal ASA	32,	250-255	(1980);
Vol. 33-35	(1981-1983),	Journal ASA	35,	252-255	(1983);
Vol. 36-38	(1984-1986),	Journal ASA	38,	284-288	(1986);
Vol. 39-41	(1987-1989),	Perspectives	42,	65-72	(1990);
Vol. 42-44	(1990-1992),	Perspectives	44,	282-288	(1992).

A keyword-based on-line **subject index** is available on 5 1/4" computer disks for most IBM compatible computers with a hard disk or two floppy disk drives. It includes all software and instructions, and can be ordered from the ASA Ipswich office for $20.

Articles appearing in *Perspectives on Science and Christian Faith* are abstracted and indexed in the CHRISTIAN PERIODICAL INDEX; RELIGION INDEX ONE: PERIODICALS; RELIGIOUS & THEOLOGICAL ABSTRACTS, and GUIDE TO SOCIAL SCIENCE AND RELIGION IN PERIODICAL LITERATURE. Book Reviews are indexed in INDEX TO BOOK REVIEWS IN RELIGION. Present and past issues of *Perspectives* are available in microfilm form at a nominal cost. For information write: University Microfilm Inc., 300 North Zeeb Rd., Ann Arbor, MI 48106.

Articles

Communications

Essay Book Review

Book Reviews

Letters

"Upholding the Universe by His Word of Power" — Hebrews 1:3

Volume 45, Number 3 **September 1993**